Cornell University Library

The original of this book is in
the Cornell University Library.

There are no known copyright restrictions in
the United States on the use of the text.

http://www.archive.org/details/cu31924031263928

Laboratory calculations and specific-gra
1924 031 263 928

# LABORATORY CALCULATIONS

AND

# *SPECIFIC-GRAVITY TABLES.*

BY

JOHN S. ADRIANCE, A.B.,
FELLOW OF THE CHEMICAL SOCIETY.

NEW YORK:
JOHN WILEY & SONS,
15 ASTOR PLACE.
1886.

CORNELL
UNIVERSITY
LIBRARY

Copyright, 1886,

By John Wiley & Sons.

# ERRATA.

Page 42, under Tannin, read 1.0200 instead of 1.0201.

Page 44, under Sodium Oxide, read 19.954 instead of 19.454.

" " " " " 1.3923 " 1.3920.

Page 45, under Potassium Oxide, read 22.237 instead of 2.237.

Page 48, under Stannic Chloride, read $SnCl_4$ instead of $SuCl_4$.

Page 57, under Potassium Carbonate, read 1.26787 instead of 1.25787.

CORNELL
UNIVERSITY
LIBRARY

THIS BOOK

IS AFFECTIONATELY DEDICATED

**To my Grandmother,**

MRS. ISAAC ADRIANCE.

# PREFACE.

THE aim in compiling this work has been to offer to the student, as well as to the analytical chemist, a substitute for much of his laborious calculations. Very much of this laborious but necessary work, the author feels, can be very easily dispensed with by the use of such help as he here offers ; and he is assured that if it be received it will be found to be indispensable in laboratory calculations.

For this purpose he has selected only those tables which are in constant use in an ordinary laboratory. They have been prepared with the utmost care, so that they are perfectly accurate and can be relied on in every particular. All the calculations are based on the atomic weights as lately determined by Prof. F. W. Clarke.

# CONTENTS.

PAGE

Absorption of Carbonic Acid in HCl .......................... 10

Absorption of Nitrogen in Hypochlorite Solution .............. 13

Alcohol Table, Tralles.......................................... 29

Alloys, Approximate Composition.... ........................ 70

Atomic Weights.................................................... 1

Atmosphere, Weight of 1 c.c......................................... 64

Barometer Heights, in Mm. and Inches....... ................ 65

Beaumé's Hydrometer Tables.................................... 28

Beaumé's Degrees in those of Tralles' Alcoholmeter............. 30

Carbonic Acid, Weight of 1 c.c..................................... 11

Coins, Silver and Minor Composition.......................... 71

Comparison of the Scales of Fahrenheit, Centigrade, Réaumur's.. 59

Comparison of the Mercurial Thermometer with the Air Thermometer............................................... 65

Converting the Per Cent of Nitrogen found into Ammonia....... 19

Converting Cubic Centimetres into Minims, etc.......... ...... 68

Converting Grains into Grams....................................... 67

Converting Grams into Grains....................................... 68

Conversion of a Column of Water to a Column of Mercury...... 65

Conversion of Pressure in Atmospheres.......................... 67

Conversion Factors.... ............................................ 5

Mercury, Volume and Density........................................ 67

Molecular Weights.................................................. 2

Nitrogen, Weight of 1 c.c............................................ 14

Percentage Composition.................... ..................... 27

Specific Gravity Tables of Acetic Acid............................ 39

——— of Alcohol by Weight and Volume....................31–32

——— of Aluminium Chloride............................ ....... 47

PAGE

Specific Gravity Tables of Aluminium Potassium Sulphate ...... 54
——— of Aluminium Ammonium Sulphate .................. 54
——— of Ammonia .................................... 43
——— of Ammonium Carbonate .......................... 58
——— of Ammonium Chloride ........................... 48
——— of Ammonium Sulphate ........................... 51
——— of Arsenic Acid and Oxide ...................... 38
——— of Barium Chloride ............................. 46
——— of Barium Nitrate .............................. 49
——— of Calcium Chloride ............................ 46
——— of Calcium Nitrate ............................. 49
——— of Cadmium Nitrate ............................. 52
——— of Citric Acid ................................. 40
——— of Cobalt Nitrate .............................. 52
——— of Copper Chloride ............................. 48
——— of Copper Nitrate .............................. 52
——— of Copper Sulphate ............................. 57
——— of Formic Acid ................................. 40
——— of Hydriodic Acid .............................. 42
——— of Hydrobromic Acid ............................ 42
——— of Hydrochloric Acid ........................... 36
——— of Hydrocyanic ................................. 41
——— of Hydrofluosilicic ............................ 41
——— of Iodic Acid .................................. 41
——— of Iron Nitrate ................................ 52
——— of Iron Sulphate ............................... 57
——— of Lead Acetate ................................ 55
——— of Lead Nitrate ................................ 52
——— of Magnesium Chloride .......................... 47
——— of Magnesium Sulphate .......................... 53
——— of Nitric Acid ................................. 37
——— of Oxalic Acid ................................. 40
——— of Phosphoric Acid and Oxide ................... 38
——— of Platinum Chloride ........................... 49
——— of Potassium Bichromate ........................ 56
——— of Potassium Chloride .......................... 45
——— of Potassium Carbonate ......................... 57
——— of Potassium Chromate .......................... 55
——— of Potassium Chromium Sulphate ................. 54

PAGE
Specific Gravity Tables of Potassium Ferricyanide.............. 55
——— of Potassium Ferrocyanide.............................. 53
——— of Potassium Nitrate................................... 53
——— of Potassium Oxide and Hydroxide....................... 45
——— of Potassium Sulphate.................................. 54
——— of Silver Nitrate...................................... 52
——— of Sodium Carbonate.................................... 58
——— of Sodium Chloride..................................... 44
——— of Sodium Hyposulphite................................. 56
——— of Sodium Nitrate...................................... 50
——— of Sodium Oxide......................................... 44
——— of Sodium Sulphate..................................... 51
——— of Stannic Chloride.................................... 48
——— of Stannous Chloride................................... 50
——— of Sulphuric Acid....................................... 35
——— of Tannin Solution..................................... 42
——— of Tartaric Acid........................................ 39
——— of Zinc Nitrate......................................... 52
——— of Zinc Sulphate........................................ 54
Sugar determined by the Saccharometer.....................33–34
Twaddles's Hydrometer and Specific Gravity.................. 30
Value of U. S. and Metrical Measures of Length............... 70
Vapors, Aqueous Tension...................................... 25
Vapors, Mercury Tension...................................... 66
Weights of Different Gases................................... 26
Water, Volume and Density.................................... 66
Weights, Measures, etc....................................... 69

# CHEMICAL CALCULATIONS.

## ATOMIC WEIGHTS ACCORDING TO PROF. F. W. CLARKE.

(*Constants of Nature*, Part V. 1882.)

| ELEMENTS. | Symbols. | Atomic Weights. | ELEMENTS. | Symbols. | Atomic Weights. |
|---|---|---|---|---|---|
| Aluminium........ | Al | 27.009 | Molybdenum...... | Mo | 95.527 |
| Antimony ........ | Sb | 119.955 | Nickel............ | Ni | 57.928 |
| Arsenic........... | As | 74.918 | Nitrogen........... | N | 14.021 |
| Barium ........... | Ba | 136.763 | Osmium........... | Os | 198.494 |
| Bismuth.......... | Bi | 207.523 | Oxygen............ | O | 15.9633 |
| Boron.......... ... | B | 10.941 | Palladium......... | Pd | 105.737 |
| Bromine.......... | Br | 79.768 | Phosphorus........ | P | 30.958 |
| Cadmium....... ... | Cd | 111.835 | Platinum.......... | Pt | 194.415 |
| Cæsium. .......... | Cs | 132.583 | | | [197.18] |
| Calcium........... | Ca | 39.990 | Potassium......... | K | 39.019 |
| Carbon............ | C | 11.9736 | Rhodium.......... | Ro | 104.055 |
| Cerium............ | Ce | 140.424 | Rubidium.......... | Rb | 85.251 |
| Chlorine.......... | Cl | 35.37 | Ruthenium......... | Ru | 104.217 |
| Chromium......... | Cr | 52.009 | Scandium.......... | Sc | 43.980 |
| Cobalt............. | Co | 58.887 | Selenium........... | Se | 78.797 |
| Columbium........ | Cb | 93.812 | Silicon............ | Si | 28.195 |
| Copper............ | Cu | 63.173 | Silver............. | Ag | 107.675 |
| Didymium......... | D | 144.573 | Sodium............ | Na | 22.998 |
| Erbium............ | E | 165.891 | Strontium.......... | Sr | 87.374 |
| Fluorine.......... | Fl | 18.984 | Sulphur............ | S | 31.984 |
| Gallium........... | Ga | 68.854 | Tantalum.......... | Ta | 182.144 |
| Glucinum......... | Gl | 9.085 | Tellurium.......... | Te | 127.960 |
| Gold.............. | Au | 196.155 | Thallium.......... | Tl | 203.715 |
| Hydrogen......... | H | 1 | Thorium.. ........ | Th | 233.414 |
| Indium............ | In | 113.398 | Tin............... | Sn | 117.698 |
| Iodine.... ........ | I | 126.557 | Titanium.......... | Ti | 49.9997 |
| Iridium........... | Ir | 192.651 | Tungsten.......... | W | 183.610 |
| Iron.............. | Fe | 55.913 | Uranium........... | U | 238.482 |
| Lanthanum....... | La | 138.526 | Vanadium.......... | V | 51.256 |
| Lead.............. | Pb | 206.471 | Ytterbium......... | Yb | 172.761 |
| Lithium........... | Li | 7.0073 | Yttrium............ | Yt | 89.816 |
| Magnesium........ | Mg | 23.959 | Zinc............... | Zn | 64.9045 |
| Manganese........ | Mn | 53.906 | Zirconium......... | Zr | 89.367 |
| Mercury... ....... | Hg | 199.712 | | | |

## TABLE OF ATOMIC AND MOLECULAR WEIGHTS.

| Elements and Compounds. | Weights. | Approximate weights |
|---|---|---|
| **Aluminium** | 27.009 | 27 |
| $AlBr_3$ | 266.313 | 266.3 |
| $AlCl_3$ | 133.119 | 133.1 |
| $AlFl_3$ | 83.961 | 84 |
| $Al(OH)_3$ | 77.8989 | 77.9 |
| $AlI_3 + 12H_2O$ | 622.2396 | 622.2 |
| $Al(NO_3)_3+15H_2O$ | 482.1912 | 482.2 |
| $Al_2O_3$ | 101.9079 | 101.9 |
| $Al_2(SO_4)_3+18H_2O$ | 664.8690 | 664.9 |
| $Al_2(SO_4)_3+K_2SO_4 + 24H_2O$ | 946.5240 | 946.5 |
| $Al_2(SO_4)_3+(NH_4)_2SO_4 + 24H_2O$ | 904.5280 | 904.5 |
| **Ammonia** ($NH_3$) | 17.021 | 17 |
| $NH_4OH$ | 34.9843 | 35 |
| $(NH_4)_2SO_4 + Al_2(SO_4)_3+24H_2O$ | 904.528 | 904.5 |
| $(NH_4)_2SO_4 + Fe_2(SO_4)_3+24H_2O$ | 962.3360 | 962.3 |
| $(NH_4)_2SO_4 + Fe(SO_4) + 6H_2O$ | 391.4092 | 391.4 |
| $(NH_4)_2SO_4 + Cr_2(SO_4)_3+24H_2O$ | 954.528 | 954.5 |
| $(NH_4)_2Cr_2O_7$ | 251.8031 | 251.8 |
| $NH_4Br$ | 97.789 | 97.8 |
| $(NH_4)_2CO_3$ | 95.9055 | 95.9 |
| $NH_4Cl$ | 53.391 | 53.4 |
| $NH_4Fl$ | 37.005 | 37 |
| $NH_4I$ | 144.578 | 144.6 |
| $(NH_4)_6Mo_7O_{24} + 4H_2O$ | 1231.787 | 1231.8 |
| $(NH_4)_2SO_4 + MnSO_4 + 6H_2O$ | 389.4022 | 389.4 |
| $NH_4MgAsO_4 + 12H_2O$ | 396.3108 | 396.3 |
| $NH_4MgAsO_4 + \frac{1}{2}H_2O$ | 189.7329 | 189.7 |
| $NH_4MgPO_4 + 6H_2O$ | 244.5710 | 244.6 |
| $(NH_4)_2SO_4 + NiSO_4 + 6H_2O$ | 393.4242 | 393.4 |
| $NH_4NO_3$ | 79.9319 | 79.9 |
| $(NH_4)_2C_2O_4$ | 123.8424 | 123.8 |

| Elements and Compounds. | Weights. | Approximate weights |
|---|---|---|
| $(NH_4)_2HPO_4$ | 131.8532 | 131.9 |
| $NH_4NaHPO_4 + 4H_2O$ | 208.6834 | 208.7 |
| $(NH_4)_2PtCl_6$ | 442.6770 | 442.7 |
| $(NH_4)_2SO_4$ | 131.8792 | 131.9 |
| **Antimony** | 119.955 | 120 |
| $HSbO_2$ | 152.8816 | 157.9 |
| $HSbO_3$ | 168.8449 | 168.8 |
| $SbOCl$ | 171.2883 | 171.3 |
| $SbCl_3$ | 226.065 | 226.1 |
| $SbCl_5$ | 296.805 | 296.8 |
| $Sb_2O_3$ | 287.7999 | 287.8 |
| $Sb_2O_4$ | 303.7632 | 303.8 |
| $Sb_2O_5$ | 319.7265 | 319.7 |
| $Sb_2S_3$ | 335.862 | 335.9 |
| $Sb_2S_5$ | 399.830 | 399.8 |
| $Sb_2(SO_4)_3$ | 527.4216 | 527.4 |
| $KSbC_4H_4O_7 \frac{1}{2}H_2O$ | 331.5931 | 331.6 |
| **Arsenic** | 74.918 | 74.9 |
| $AsBr_3$ | 314.222 | 314.2 |
| $AsCl_3$ | 181.028 | 181 |
| $AsI_3$ | 454.589 | 454.6 |
| $AsFl_3$ | 131.870 | 131.9 |
| $As_2O_3$ | 197.7259 | 197.7 |
| $As_2O_5$ | 229.6525 | 229.7 |
| $As_2S_3$ | 245.788 | 245.8 |
| $As_2S_5$ | 309.756 | 309.8 |
| $NH_4MgAsO_4 + 12H_2O$ | 396.3108 | 396.3 |
| $NH_4MgAsO_4 + \frac{1}{2}H_2O$ | 189.7329 | 189.7 |
| $Mg_2As_2O_7$ | 309.4971 | 309.5 |
| **Barium** | 136.7630 | 136.8 |
| $BaCO_3$ | 196.6265 | 196.6 |
| $BaCrO_4$ | 252.6252 | 252.6 |
| $BaCl_2 + 2H_2O$ | 243.4296 | 243.4 |
| $Ba(NO_3)_2$ | 260.5848 | 260.6 |
| $BaO$ | 152.7263 | 152.7 |
| $BaO_2$ | 168.6896 | 168.7 |
| $BaSO_4$ | 232.6002 | 232.6 |
| $BaSiFl_6$ | 278.862 | 278.9 |

## ATOMIC AND MOLECULAR WEIGHTS—*Continued.*

| ELEMENTS AND COMPOUNDS. | Weights. | Approximate weights | ELEMENTS AND COMPOUNDS. | Weights. | Approximate weights |
|---|---|---|---|---|---|
| **Bismuth** | 207.523 | 207.5 | $CoSO_4 + K_2SO_4 + 6H_2O$ | 436.3792 | 436.4 |
| $BiCl_3$ | 313.633 | 313.6 | $CoSO_4 + 7H_2O$ | 280.4673 | 280.5 |
| $BiOCl$ | 258.8563 | 258.9 | $Co(NO_2)_3 + 3KNO_2$ | 451.6296 | 451.6 |
| $Bi_2O_3$ | 462.9359 | 462.9 | **Copper** | 63.173 | 63.2 |
| $Bi(NO_3)_3 + 5H_2O$ | 483.0722 | 483.1 | $CuO$ | 79.1363 | 79.1 |
| $Bi_2(SO_4)_3$ | 702.5576 | 702.6 | $CuSO_4 + 5H_2O$ | 248.8267 | 248.8 |
| $Bi_2S_3$ | 510.998 | 511 | $Cu_2S$ | 158.330 | 158.3 |
| $Bi_8Cr_2O_{16}$ | 1588.606 | 1588 | $CuS$ | 95.157 | 95.2 |
| **Boron** | 10.941 | 10.9 | **Fluorine** | 18.984 | 19 |
| $B_2O_3$ | 69.7719 | 69.8 | $CaFl_2$ | 77.958 | 78 |
| $KBFl_4$ | 125.896 | 125.9 | $BaSiFl_6$ | 278.862 | 278.9 |
| **Bromine** | 79.768 | 79.8 | $K_2SiFl_6$ | 220.137 | 220.1 |
| $KBr$ | 118.787 | 118.8 | **Hydrogen** | 1 | 1 |
| $AgBr$ | 187.443 | 187.4 | $H_2O$ | 17.9633 | 18 |
| $HBr$ | 80.768 | 80.8 | $H_2O_2$ | 33.9266 | 33.9 |
| **Cadmium** | 111.8350 | 111.8 | **Iodine** | 126.557 | 126.6 |
| $CdCO_3$ | 171.6985 | 171.7 | $KI$ | 165.576 | 165.6 |
| $CdO$ | 127.7983 | 127.8 | $AgI$ | 234.232 | 234.2 |
| $CdS$ | 143.819 | 143.8 | $PbI_2$ | 459.5850 | 459.6 |
| **Calcium** | 39.99 | 40 | **Iron** | 55.913 | 55.9 |
| $CaO$ | 55.9533 | 56 | $Fe_2O_3$ | 159.7159 | 159.7 |
| $CaCO_3$ | 99.8535 | 99.9 | $FeS$ | 87.897 | 87.9 |
| $CaHPO_4 + 2H_2O$ | 171.7278 | 171.7 | $FeSO_4 + 7H_2O$ | 277.4933 | 277.5 |
| $Ca_3(PO_4)_2$ | 309.5924 | 309.6 | $Fe_3O_4$ | 231.5922 | 231.6 |
| $CaSO_4$ | 135.8272 | 135.8 | **Lead** | 206.471 | 206.5 |
| **Carbon** | 11.9736 | 12 | $PbO$ | 222.4343 | 222.4 |
| $CO$ | 27.9369 | 27.9 | $PbCrO_4$ | 322.3332 | 322.3 |
| $CO_2$ | 43.9002 | 43.9 | $PbCl_2$ | 277.211 | 277.2 |
| $CO_3$ | 59.8635 | 59.9 | $PbCO_3$ | 266.3345 | 266.3 |
| **Chlorine** | 35.37 | 35.4 | $Pb(NO_3)_2$ | 330.2928 | 330.3 |
| $AgCl$ | 143.045 | 143 | $PbS$ | 238.4550 | 238.5 |
| $NaCl$ | 58.368 | 58.4 | $PbSO_4$ | 302.3082 | 302.3 |
| $Cl_2O_5$ | 150.5565 | 150.6 | **Magnesium** | 23.9590 | 24 |
| **Chromium** | 52.009 | 52 | $MgO$ | 39.9223 | 39.9 |
| $Cr_2O_3$ | 151.9079 | 151.9 | $MgSO_4 + 7H_2O$ | 245.5393 | 245.5 |
| $K_2Cr_2O_7$ | 293.7991 | 293.8 | $Mg_2P_2O_7$ | 221.5771 | 221.6 |
| $K_2CrO_4$ | 193.9002 | 193.9 | $MgNH_4AsO_4 + \frac{1}{2}H_2O$ | 189.7329 | 189.7 |
| $K_2SO_4 + Cr_2(SO_4)_3 + 24H_2O$ | 996.524 | 996.5 | **Manganese** | 53.906 | 53.9 |
| $CrCl_3$ | 158.119 | 158.1 | $MnO$ | 69.8693 | 69.9 |
| **Cobalt** | 58.887 | 58.9 | $MnO_2$ | 85.8326 | 85.8 |
| $CoO$ | 74.8503 | 74.9 | | | |
| $CoCO_3$ | 118.7505 | 118.8 | | | |

ATOMIC AND MOLECULAR WEIGHTS—*Continued.*

| ELEMENTS AND COMPOUNDS. | Weights. | Approximate weights | ELEMENTS AND COMPOUNDS. | Weights. | Approximate weights |
|---|---|---|---|---|---|
| $Mn_3O_4$ | 225.5712 | 225.6 | **Potassium** | 39.019 | 39 |
| $Mn_2P_2O_7$ | 281.4711 | 281.5 | $K_2O$ | 94.0013 | 94 |
| $MnSO_4 + 7H_2O$ | 275.4863 | 275.5 | $KCl$ | 74.389 | 74.4 |
| $MnS$ | 85.89 | 85.9 | $K_2SO_4$ | 173.8752 | 173.9 |
| $KMnO_4$ | 156.7782 | 156.8 | $KNO_3$ | 100.9299 | 100.9 |
| **Mercury** | 199.7120 | 199.7 | **Silicon** | 28.195 | 28.2 |
| $HgO$ | 215.6753 | 215.7 | $SiO_2$ | 60.1216 | 60.1 |
| $Hg_2O$ | 415.3873 | 415.4 | $K_2SiFl_6$ | 220.137 | 220.1 |
| $HgI_2$ | 452.826 | 452.8 | $SiFl_4$ | 104.131 | 104.1 |
| $HgCl_2$ | 270.452 | 270.5 | **Silver** | 107.6750 | 107.7 |
| $Hg_2Cl_2$ | 470.164 | 470.2 | $AgCl$ | 143.045 | 143 |
| $HgS$ | 231.696 | 231.7 | $AgNO_3$ | 169.5859 | 169.6 |
| **Nickel** | 57.928 | 57.9 | $Ag_3PO_4$ | 417.8362 | 417.8 |
| $NiO$ | 73.8913 | 73.9 | $AgI$ | 234.232 | 234.2 |
| $NiSO_4 + 7H_2O$ | 279.5083 | 279.5 | **Sodium** | 22.998 | 23 |
| $Ni(NO_3)_2 + 6H_2O$ | 289.5296 | 289.5 | $NaCl$ | 58.368 | 58.4 |
| $NiS$ | 89.912 | 89.9 | $Na_2CO_3$ | 105.8595 | 105.9 |
| **Nitrogen** | 14.021 | 14 | $Na_2O$ | 61.9593 | 62 |
| $N_2O_5$ | 107.8585 | 107.9 | $Na_2SO_4$ | 141.8332 | 141.8 |
| $NO_3$ | 61.9109 | 61.9 | **Strontium** | 87.374 | 87.4 |
| $N_2O_3$ | 75.9319 | 75.9 | $Sr(NO_3)_2$ | 211.1958 | 211.2 |
| $HNO_3$ | 62.9109 | 62.9 | $SrO$ | 103.3373 | 103.3 |
| $KNO_3$ | 100.9299 | 100.9 | $SrSO_4$ | 183.2112 | 183.2 |
| **Oxygen** | 15.9633 | 16 | $SrCO_3$ | 147.2375 | 147.2 |
| $O_2$ | 31.9266 | 31.9 | **Sulphur** | 31.984 | 32 |
| $O_3$ | 47.8899 | 47.9 | $SO_2$ | 63.9106 | 63.9 |
| $O_4$ | 63.8532 | 63.9 | $SO_3$ | 79.8739 | 79.9 |
| $O_5$ | 79.8165 | 79.8 | $SO_4$ | 95.8372 | 95.8 |
| $O_6$ | 95.7798 | 95.8 | $H_2SO_4$ | 97.8372 | 97.8 |
| $O_7$ | 111.7431 | 111.7 | $H_2S$ | 33.984 | 34 |
| $O_8$ | 127.7064 | 127.7 | **Tin** | 117.698 | 117.7 |
| $O_9$ | 143.6697 | 143.7 | $SnO_2$ | 149.6246 | 149.6 |
| **Phosphorus** | 30.958 | 31 | $SnCl_2 + 2H_2O$ | 224.3646 | 224.4 |
| $P_2O_5$ | 141.7325 | 141.7 | **Zinc** | 64.9045 | 64.9 |
| $U_2P_2O_{11}$ | 714.4763 | 714.5 | $ZnO$ | 80.8678 | 80.9 |
| $Ag_3PO_4$ | 417.8362 | 417.8 | $ZnSO_4 + 7H_2O$ | 286.4848 | 286.5 |
| $PO_4$ | 94.8112 | 94.8 | $ZnS$ | 96.8885 | 96.9 |
| **Platinum** | 194.415 | 194.4 | $K_2SO_4ZnSO_4 + 6H_2O$ | 442.3967 | 442.4 |
| $K_2PtCl_6$ | 484.6730 | 484.7 | | | |

## CONVERSION-FACTORS COMMONLY USED IN ANALYSIS.

| Found. | Symbols. | Sought. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminium oxide... | $Al_2O_3$ | $Al_2$ | .53007 | 1.06013 | 1.59020 | 2.12026 | 2.65033 | 3.18040 | 3.71046 | 4.24053 | 4.77059 |
| Ammonium chloride | $NH_4Cl$ | $NH_3$ | .31880 | .63760 | .95640 | 1.27520 | 1.59400 | 1.91279 | 2.23159 | 2.55039 | 2.86919 |
| Ammonium platinic chloride.......... | $(NH_4)_2PtCl_6$ | $2NH_3$ | .07690 | .15380 | .23070 | .30760 | .38450 | .46140 | .53830 | .61520 | .69210 |
| Ammonium platinic chloride.......... | $(NH_4)_2PtCl_6$ | $2N$ | .06335 | .12669 | .19004 | .25338 | .31673 | .38008 | .44342 | .50677 | .57011 |
| Antimony tetroxide. | $Sb_2O_4$ | $Sb_2$ | .78979 | 1.57958 | 2.36938 | 3.15917 | 3.94896 | 4.73875 | 5.52854 | 6.31834 | 7.10813 |
| Antimony sulphide.. | $Sb_2S_3$ | " | .71431 | 1.42862 | 2.14293 | 2.85724 | 3.57156 | 4.28587 | 5.00018 | 5.71449 | 6.42880 |
| 2 Ammonium magnesic arsenate + ½H₂O............ | $NH_4MgAsO_4 + \frac{1}{2}H_2O$ | $As_2O_5$ | .60520 | 1.21040 | 1.81560 | 2.42080 | 3.02600 | 3.63119 | 4.23639 | 4.84159 | 5.44679 |
| 2 Ammonium magnesic arsenate + ½H₂O............ | $NH_4MgAsO_4 + \frac{1}{2}H_2O$ | $As_2$ | .39486 | .78972 | 1.18458 | 1.57944 | 1.97430 | 2.36916 | 2.76402 | 3.15888 | 3.55374 |
| Magnesium pyro-arsenate........... | $Mg_2As_2O_7$ | $As_2O_5$ | .74202 | 1.48404 | 2.22605 | 2.96807 | 3.71009 | 4.45211 | 5.19413 | 5.93614 | 6.67816 |
| Magnesium pyro-arsenate........... | $Mg_2As_2O_7$ | $As_2$ | .48413 | .96826 | 1.45238 | 1.93651 | 2.42064 | 2.90477 | 3.38890 | 3.87302 | 4.35715 |
| Arsenious sulphide.. | $As_2S_3$ | $As_2O_5$ | .93435 | 1.86870 | 2.80305 | 3.73740 | 4.67176 | 5.60611 | 6.54046 | 7.47481 | 8.40916 |
| " " | " | $As_2$ | .60961 | 1.21923 | 1.82884 | 2.43846 | 3.04807 | 3.65768 | 4.26730 | 4.87691 | 5.48653 |
| Barium sulphate .... | $BaSO_4$ | Ba | .58797 | 1.17595 | 1.76392 | 2.35190 | 2.93987 | 3.52784 | 4.11582 | 4.70379 | 5.29177 |
| " " | " | BaO | .65660 | 1.31321 | 1.96981 | 2.62642 | 3.28302 | 3.93962 | 4.59623 | 5.25283 | 5.90944 |
| " " | " | S | .13751 | .27501 | .41252 | .55002 | .68753 | .82504 | .96254 | 1.10005 | 1.23755 |
| " " | " | $SO_3$ | .34340 | .68679 | 1.03019 | 1.37358 | 1.71698 | 2.06037 | 2.40377 | 2.74716 | 3.09056 |
| " " | " | $SO_4$ | .41203 | .82405 | 1.23608 | 1.64810 | 2.06013 | 2.47215 | 2.88418 | 3.29620 | 3.70823 |
| Barium carbonate... | $BaCO_3$ | Ba | .69555 | 1.39109 | 2.08664 | 2.78219 | 3.47774 | 4.17328 | 4.86883 | 5.56438 | 6.25992 |
| " " | " | BaO | .77673 | 1.55347 | 2.33020 | 3.10693 | 3.88367 | 4.66040 | 5.43713 | 6.21386 | 6.99060 |

CONVERSION-FACTORS—*Continued.*

| FOUND. | Symbols. | Sought. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Barium carbonate... | $BaCO_3$ | $CO_3$ | .30445 | .60890 | .91336 | 1.21781 | 1.52226 | 1.82671 | 2.13116 | 2.43562 | 2.74007 |
| Bismuth oxide..... | $Bi_2O_3$ | $Bi_2$ | .89655 | 1.79310 | 2.68965 | 3.58620 | 4.48276 | 5.37931 | 6.27586 | 7.17241 | 8.06896 |
| Bismuth sulphide... | $Bi_2S_3$ | " | .81223 | 1.62445 | 2.43668 | 3.24890 | 4.06113 | 4.87336 | 5.68558 | 6.49781 | 7.31003 |
| Boron oxide........ | $B_2O_3$ | $B_2$ | .31362 | .62724 | .94086 | 1.25448 | 1.56811 | 1.88173 | 2.19535 | 2.50897 | 2.82259 |
| Cadmium oxide..... | $CdO$ | $Cd$ | .87509 | 1.75018 | 2.62527 | 3.50036 | 4.37545 | 5.25053 | 6.12562 | 7.00071 | 7.87580 |
| Cadmium sulphide.. | $CdS$ | $CdO$ | .88861 | 1.77721 | 2.66582 | 3.55442 | 4.44303 | 5.33163 | 6.22024 | 7.10884 | 7.99745 |
| " " | " | $Cd$ | .77761 | 1.55522 | 2.33283 | 3.11044 | 3.88805 | 4.66565 | 5.44326 | 6.22087 | 6.99848 |
| Calcium oxide...... | $CaO$ | $Ca$ | .71470 | 1.42941 | 2.14411 | 2.85881 | 3.57352 | 4.28822 | 5.00292 | 5.71762 | 6.43233 |
| " " | " | $CaCO_3$ | 1.78459 | 3.56917 | 5.35376 | 7.13834 | 8.92293 | 10.70752 | 12.49210 | 14.27669 | 16.06127 |
| " " | " | $CaSO_4$ | 2.42751 | 4.85502 | 7.28253 | 9.71004 | 12.13755 | 14.56506 | 16.99257 | 19.42008 | 21.84759 |
| " " | " | $CaSO_4 + 2H_2O$ | 3.06959 | 6.13918 | 9.20877 | 12.27836 | 15.34796 | 18.41755 | 21.48714 | 24.55673 | 27.62632 |
| Calcium carbonate.. | $CaCO_3$ | $Ca$ | .40049 | .80097 | 1.20146 | 1.60194 | 2.00243 | 2.40292 | 2.80340 | 3.20389 | 3.60437 |
| " " | " | $CaO$ | .56035 | 1.12071 | 1.68106 | 2.24141 | 2.80177 | 3.36212 | 3.92247 | 4.48282 | 5.04318 |
| " " | " | $CO_2$ | .43965 | .87929 | 1.31894 | 1.75858 | 2.19823 | 2.63788 | 3.07752 | 3.51717 | 3.95681 |
| " " | " | $CO_3$ | .59951 | 1.19903 | 1.79854 | 2.39805 | 2.99757 | 3.59708 | 4.19659 | 4.79610 | 5.39562 |
| " " | " | $CaSO_4 + 2H_2O$ | 1.72006 | 3.44011 | 5.16017 | 6.88023 | 8.60029 | 10.32034 | 12.04040 | 13.76046 | 15.48051 |
| Calcium sulphate... | $CaSO_4$ | $Ca$ | .29442 | .58884 | .88325 | 1.17767 | 1.47209 | 1.76651 | 2.06093 | 2.35534 | 2.64976 |
| " " | " | $CaO$ | .41194 | .82389 | 1.23583 | 1.64778 | 2.05972 | 2.47166 | 2.88361 | 3.29555 | 3.70750 |
| " " | " | $CaCO_3$ | .73515 | 1.47030 | 2.20545 | 2.94060 | 3.67575 | 4.41090 | 5.14605 | 5.88120 | 6.61635 |
| Carbon dioxide. ... | $CO_2$ | $C$ | .27275 | .54549 | .81824 | 1.09098 | 1.36373 | 1.63647 | 1.90922 | 2.18196 | 2.45471 |
| " " | " | $CaCO_3$ | 2.27456 | 4.54911 | 6.82367 | 9.09822 | 11.37278 | 13.64734 | 15.92189 | 18.19645 | 20.47100 |
| 2 " " | " | $MnO_2$ | .97759 | 1.95517 | 2.93276 | 3.91035 | 4.88794 | 5.86552 | 6.84311 | 7.82070 | 8.79828 |
| Chlorine... ........ | $Cl$ | $NaCl$ | 1.65021 | 3.30042 | 4.95064 | 6.60085 | 8.25106 | 9.90127 | 11.55148 | 13.20170 | 14.85191 |
| Silver chloride...... | $AgCl$ | $Cl$ | .24726 | .49453 | .74179 | .98906 | 1.23632 | 1.48358 | 1.73085 | 1.97811 | 2.22538 |
| " " | " | $HCl$ | .25426 | .50851 | .76277 | 1.01702 | 1.27128 | 1.52553 | 1.77979 | 2.03404 | 2.28830 |

CONVERSION-FACTORS—*Continued.*

| FOUND. | Symbols. | Sought. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Silver Chloride..... | AgCl | Ag | .75274 | 1.50547 | 2.25821 | 3.01094 | 3.76368 | 4.51641 | 5.26915 | 6.02188 | 6.77462 |
| Chromium oxide.... | $Cr_2O_3$ | $Cr_2$ | .68474 | 1.36949 | 2.05423 | 2.73897 | 3.42372 | 4.10846 | 4.79320 | 5.47794 | 6.16269 |
| Cobalt oxide........ | CoO | Co | .78673 | 1.57346 | 2.36019 | 3.14692 | 3.93365 | 4.72038 | 5.50711 | 6.29384 | 7.08057 |
| Copper oxide....... | CuO | Cu | .79828 | 1.59656 | 2.39484 | 3.19312 | 3.99140 | 4.78968 | 5.58796 | 6.38624 | 7.18452 |
| Copper sulphide.... | $Cu_2S$ | $Cu_2$ | .79799 | 1.59598 | 2.39397 | 3.19196 | 3.98996 | 4.78795 | 5.58594 | 6.38393 | 7.18192 |
| Calcium fluoride.... | $CaFl_2$ | $Fl_2$ | .48703 | .97406 | 1.46109 | 1.94812 | 2.43516 | 2.92219 | 3.40922 | 3.89625 | 4.38328 |
| Iron oxide... ..... | $Fe_2O_3$ | $Fe_2$ | .70016 | 1.40031 | 2.10047 | 2.80062 | 3.50078 | 4.20093 | 4.90109 | 5.60124 | 6.30140 |
| Iron sulphide....... | 2 FeS | $Fe_2O_3$ | .90854 | 1.81708 | 2.72562 | 3.63416 | 4.54270 | 5.45124 | 6.35978 | 7.26832 | 8.17686 |
| " " | FeS | Fe | .63612 | 1.27224 | 1.90836 | 2.54448 | 3.18060 | 3.81671 | 4.45283 | 5.08895 | 5.72507 |
| Lead sulphate...... | $PbSO_4$ | Pb | .68298 | 1.36596 | 2.04894 | 2.73192 | 3.41491 | 4.09789 | 4.78087 | 5.46385 | 6.14683 |
| " " | " | PbO | .73579 | 1.47157 | 2.20736 | 2.94314 | 3.67893 | 4.41472 | 5.15050 | 5.88629 | 6.62207 |
| Lead sulphide...... | PbS | Pb | .86587 | 1.73174 | 2.59761 | 3.46348 | 4.32935 | 5.19521 | 6.06108 | 6.92695 | 7.79282 |
| " " | " | PbO | .93281 | 1.86563 | 2.79844 | 3.73126 | 4.66407 | 5.59688 | 6.52970 | 7.46251 | 8.39533 |
| Lead chromate..... | $PbCrO_4$ | Pb | .64055 | 1.28110 | 1.92165 | 2.56220 | 3.20276 | 3.84331 | 4.48386 | 5.12441 | 5.76496 |
| " " | " | PbO | .69008 | 1.38015 | 2.07023 | 2.76030 | 3.45038 | 4.14045 | 4.83053 | 5.52060 | 6.21068 |
| Magnesium pyro phosphate........ | $Mg_2P_2O_7$ | $Mg_2$ | .21626 | .43252 | .64877 | .86503 | 1.08129 | 1.29755 | 1.51381 | 1.73006 | 1.94632 |
| Magnesium pyrophosphate........ | $Mg_2P_2O_7$ | 2MgO | .36035 | .72069 | 1.08104 | 1.44138 | 1.80173 | 2.16208 | 2.52242 | 2.88277 | 3.24311 |
| Magnesium sulphate | $MgSO_4$ | Mg | .20000 | .39999 | .59999 | .79999 | .99999 | 1.19998 | 1.39998 | 1.59998 | 1.79997 |
| " " | " | MgO | .33325 | .66650 | .99975 | 1.33300 | 1.66626 | 1.99951 | 2.33276 | 2.66601 | 2.99926 |
| Magnesium pyrophosphate........ | $Mg_2P_2O_7$ | $Ca_3P_2O_8$ | 1.39722 | 2.79444 | 4.19167 | 5.58889 | 6.98611 | 8.38333 | 9.78055 | 11.17778 | 12.57500 |
| Manganese tetroxide | $Mn_3O_4$ | 3Mn | .71693 | 1.43385 | 2.15078 | 2.86770 | 3.58463 | 4.30156 | 5.01848 | 5.73541 | 6.45233 |
| " " | " | 3MnO | .92923 | 1.85846 | 2.78769 | 3.71692 | 4.64616 | 5.57539 | 6.50462 | 7.43385 | 8 36308 |
| Manganese pyrophosphate........ | $Mn_2P_2O_7$ | $Mn_2$ | .38303 | .76606 | 1.14909 | 1.53212 | 1.91515 | 2.29818 | 2.68121 | 3.06424 | 3.44727 |

CONVERSION-FACTORS—*Continued.*

| FOUND. | Symbols. | Sought. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Manganese pyrophosphate........ | $Mn_2P_2O_7$ | 2 MnO | .49646 | .99292 | 1.48937 | 1.98583 | 2.48229 | 2.97875 | 3.47521 | 3.97166 | 4.46812 |
| Manganese sulphate. | $MnSO_4$ | Mn | .35999 | .71999 | 1.07997 | 1.43996 | 1.79995 | 2.15993 | 2.51992 | 2.87991 | 3.23990 |
| " " | " | MnO | .46659 | .93319 | 1.39978 | 1.86638 | 2.33297 | 2.79956 | 3.26616 | 3.73275 | 4.19935 |
| Manganese sulphide. | MnS | Mn | .62762 | 1.25523 | 1.88285 | 2.51046 | 3.13808 | 3.76570 | 4.39331 | 5.02093 | 5.64854 |
| " " | " | MnO | .81347 | 1.62695 | 2.44042 | 3.25390 | 4.06737 | 4.88084 | 5.69432 | 6.50779 | 7.32127 |
| Mercury sulphide... | HgS | Hg | .86196 | 1.72391 | 2.58587 | 3.44783 | 4.30979 | 5.17174 | 6.03370 | 6.89566 | 7.75761 |
| " " | " | HgO | .93085 | 1.86171 | 2.79256 | 3.72342 | 4.65427 | 5.58512 | 6.51598 | 7.44683 | 8.37769 |
| Mercurous chloride. | $Hg_2Cl_2$ | $Hg_2$ | .84954 | 1.69908 | 2.54862 | 3.39816 | 4.24771 | 5.09725 | 5.94679 | 6.79633 | 7.64587 |
| " " | " | $Hg_2O$ | .88349 | 1.76699 | 2.65048 | 3.53398 | 4.41747 | 5.30096 | 6.18446 | 7.06795 | 7.95145 |
| Nickel oxide........ | NiO | Ni | .78396 | 1.56792 | 2.35189 | 3.13585 | 3.91981 | 4.70377 | 5.48773 | 6.27170 | 7.05566 |
| Nitrogen........... | N | $NH_3$ | 1.21396 | 2.42793 | 3.64189 | 4.85586 | 6.06982 | 7.28378 | 8.49775 | 9.71171 | 10.92568 |
| Magnesium pyrophosphate........ | $Mg_2P_2O_7$ | $P_2O_5$ | .63965 | 1.27931 | 1.91896 | 2.55861 | 3.19827 | 3.83792 | 4.47757 | 5.11722 | 5.75688 |
| Uranium pyrophosphate............ | $U_2P_2O_{11}$ | " | .19837 | .39674 | .59512 | .79349 | .99186 | 1.19023 | 1.38860 | 1.58698 | 1.78535 |
| Phosphoric oxide... | $P_2O_5$ | $Ca_3P_2O_8$ | 2.18434 | 4.36869 | 6.55303 | 8.73737 | 10.92172 | 13.10606 | 15.29040 | 17.47474 | 19.65909 |
| Potassium platinic chloride.......... | $K_2PtCl_6$ | $K_2$ | .16101 | .32202 | .48303 | .64404 | .80506 | .96607 | 1.12708 | 1.28809 | 1.44910 |
| Potassium platinic chloride.......... | " | 2 KCl | .30697 | .61393 | .92090 | 1.22786 | 1.53483 | 1.84179 | 2.14876 | 2.45572 | 2.76269 |
| Potassium platinic chloride.......... | " | $K_2SO_4$ | .35875 | .71749 | 1.07624 | 1.43499 | 1.79374 | 2.15248 | 2.51123 | 2.86998 | 3.22872 |
| Potassium.......... | $K_2$ | $K_2O$ | 1.20456 | 2.40912 | 3.61367 | 4.81823 | 6.02279 | 7.22735 | 8.43191 | 9.63646 | 10.84102 |
| Potassium.......... | K | KCl | 1.90648 | 3.81296 | 5.71944 | 7.62592 | 9.53241 | 11.43889 | 13.34537 | 15.25185 | 17.15833 |
| Potassium oxide.... | $K_2O$ | 2KCl | 1.58272 | 3.16544 | 4.74817 | 6.33089 | 7.91361 | 9.49633 | 11.07905 | 12.66178 | 14.24450 |

CONVERSION-FACTORS—*Continued.*

| FOUND. | Symbols. | Sought. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Potassium oxide.... | $K_2O$ | $K_2SO_4$ | 1.84971 | 3.69942 | 5.54913 | 7.39884 | 9.24855 | 11.09826 | 12.94797 | 14.79768 | 16.64739 |
| Platinum.......... | Pt | $2NH_2$ | .17510 | .35020 | .52530 | .70040 | .87550 | 1.05059 | 1.22569 | 1.40079 | 1.57589 |
| " | " | 2N | .14424 | .28847 | .43271 | .57695 | .72119 | .86542 | 1.00966 | 1.15390 | 1.29813 |
| Silicon oxide........ | $SiO_2$ | Si | .46897 | .93793 | 1.40690 | 1.87586 | 2.34483 | 2.81380 | 3.28276 | 3.75173 | 4.22069 |
| Silver bromide...... | AgBr | Br | .42556 | .85112 | 1.27667 | 1.70223 | 2.12779 | 2.55335 | 2.97891 | 3.40446 | 3.83002 |
| Silver iodide........ | AgI | I | .54031 | 1.08061 | 1.62092 | 2.16122 | 2.70153 | 3.24184 | 3.78214 | 4.32245 | 4.86275 |
| Sodium .......... | $Na_2$ | $Na_2O$ | 1.34706 | 2.69412 | 4.04117 | 5.38823 | 6.73529 | 8.08235 | 9.42941 | 10.77646 | 12.12352 |
| " | Na | NaCl | 2.53796 | 5.07592 | 7.61388 | 10.15184 | 12.68980 | 15.22775 | 17.76571 | 20.30367 | 22.84163 |
| Sodium oxide....... | $Na_2O$ | 2 NaCl | 1.88408 | 3.76815 | 5.65223 | 7.53630 | 9.42038 | 11.30445 | 13.18853 | 15.07260 | 16.95668 |
| Sodium sulphate.... | $Na_2SO_4$ | $Na_2$ | .32430 | .64859 | .97289 | 1.29718 | 1.62148 | 1.94578 | 2.27007 | 2.59437 | 2.91866 |
| " " | " | $Na_2O$ | .43685 | .87369 | 1.31054 | 1.74738 | 2.18423 | 2.62108 | 3.05792 | 3.49477 | 3.93161 |
| 2 Sodium chloride .. | 2NaCl | $Na_2O$ | .53076 | 1.06153 | 1.59229 | 2.12306 | 2.65382 | 3.18458 | 3.71535 | 4.24611 | 4.77688 |
| Strontium carbonate | $SrCO_3$ | Sr | .59342 | 1.18684 | 1.78027 | 2.37369 | 2.96711 | 3.56053 | 4.15395 | 4.74738 | 5.34080 |
| Strontium sulphate.. | $SrSO_4$ | " | .47690 | .95381 | 1.43071 | 1.90761 | 2.38452 | 2.86142 | 3.33832 | 3.81522 | 4.29213 |
| Tin oxide.......... | $SnO_2$ | Sn | .78662 | 1.57324 | 2.35986 | 3.14648 | 3.93311 | 4.71973 | 5.50635 | 6.29297 | 7.07959 |
| Zinc oxide.......... | ZnO | Zn | .80260 | 1.60520 | 2.40780 | 3.21040 | 4.01300 | 4.81560 | 5.61820 | 6.42080 | 7.22340 |
| Zinc sulphide....... | ZnS | " | .66989 | 1.33978 | 2.00966 | 2.67955 | 3.34944 | 4.01933 | 4.68922 | 5.35910 | 6.02899 |

It has been carefully determined that the atomic weight of Platinum should be taken as 197.18, while really it is 194.415, since the factor obtained from 197.18 gives more correct results in calculations. (*Vide* Fresenius, *Zeitschr. für Analyt. Chem.*, XXI., 1882, p. 234.)

## TABLE OF THE ABSORPTION OF CARBONIC ACID IN 5 C.C. OF HCl. SPECIFIC GRAVITY OF 1.125, FOR AN EVOLUTION OF 1 TO 100 C.C.

| Ev. | Absorbed. | Evolved. | Absorbed. | Evolved. | Absorbed. | Evolved. | Absorbed. | Evolved. | Absorbed |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.85 | 21 | 4.95 | 41 | 5.24 | 61 | 5.50 | 81 | 5.78 |
| 2 | 2.00 | 22 | 4.96 | 42 | 5.25 | 62 | 5.51 | 82 | 5.79 |
| 3 | 2.16 | 23 | 4.97 | 43 | 5.26 | 63 | 5.52 | 83 | 5.80 |
| 4 | 2.31 | 24 | 4.98 | 44 | 5.27 | 64 | 5.54 | 84 | 5.82 |
| 5 | 2.47 | 25 | 5.00 | 45 | 5.28 | 65 | 5.55 | 85 | 5.83 |
| 6 | 2.62 | 26 | 5.03 | 46 | 5.30 | 66 | 5.57 | 86 | 5.85 |
| 7 | 2.78 | 27 | 5.04 | 47 | 5.31 | 67 | 5.58 | 87 | 5.86 |
| 8 | 2.93 | 28 | 5.06 | 48 | 5.32 | 68 | 5.59 | 88 | 5.87 |
| 9 | 3.09 | 29 | 5.07 | 49 | 5.34 | 69 | 5.61 | 89 | 5.89 |
| 10 | 3.24 | 30 | 5.09 | 50 | 5.35 | 70 | 5.62 | 90 | 5.90 |
| 11 | 3.40 | 31 | 5.10 | 51 | 5.36 | 71 | 5.64 | 91 | 5.92 |
| 12 | 3.55 | 32 | 5.11 | 52 | 5.37 | 72 | 5.65 | 92 | 5.93 |
| 13 | 3.71 | 33 | 5.13 | 53 | 5.38 | 73 | 5.66 | 93 | 5.94 |
| 14 | 3.86 | 34 | 5.14 | 54 | 5.40 | 74 | 5.68 | 94 | 5.96 |
| 15 | 4.02 | 35 | 5.16 | 55 | 5.41 | 75 | 5.69 | 95 | 5.97 |
| 16 | 4.17 | 36 | 5.17 | 56 | 5.43 | 76 | 5.71 | 96 | 5.99 |
| 17 | 4.33 | 37 | 5.18 | 57 | 5.44 | 77 | 5.72 | 97 | 6.00 |
| 18 | 4.48 | 38 | 5.20 | 58 | 5.45 | 78 | 5.73 | 98 | 6.01 |
| 19 | 4.64 | 39 | 5.21 | 59 | 5.47 | 79 | 5.75 | 99 | 6.03 |
| 20 | 4.79 | 40 | 5.23 | 60 | 5.48 | 80 | 5.76 | 100 | 6.04 |

## THE WEIGHT OF ONE CUBIC CENTIMETRE OF CARBONIC ACID FOR THE VARIATIONS OF TEMPERATURE AND PRESSURE.

| Degrees Fahr. | Degrees Cent. | 720 mm. 28.35 inches. | 722 mm. 28.42 inches. | 724 mm. 28.50 inches. | 726 mm. 28.58 inches. | 728 mm. 28.66 inches. | 730 mm. 28.74 inches. | 732 mm. 28.82 inches. | 734 mm. 28.90 inches. | 736 mm. 28.98 inches. | 738 mm. 29.06 inches. | 740 mm. 29.13 inches. | 742 mm. 29.21 inches. | 744 mm. 29.29 inches. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | 10 | 1.77446 | 1.77945 | 1.78445 | 1.78944 | 1.79443 | 1.79942 | 1.80441 | 1.80941 | 1.81440 | 1.81940 | 1.82438 | 1.82937 | 1.83437 |
| 51.8 | 11 | 1.76668 | 1.77165 | 1.77622 | 1.78160 | 1.78657 | 1.79155 | 1.79652 | 1.80149 | 1.80647 | 1.81144 | 1.81642 | 1.82139 | 1.82636 |
| 53.6 | 12 | 1.75881 | 1.76377 | 1.76873 | 1.77368 | 1.77864 | 1.78359 | 1.78855 | 1.79351 | 1.79846 | 1.80342 | 1.80838 | 1.81333 | 1.81829 |
| 55.4 | 13 | 1.75092 | 1.75587 | 1.76081 | 1.76576 | 1.77070 | 1.77565 | 1.78059 | 1.78554 | 1.79048 | 1.79543 | 1.80037 | 1.80532 | 1.81026 |
| 57.2 | 14 | 1.74301 | 1.74795 | 1.75288 | 1.75781 | 1.76275 | 1.76768 | 1.77261 | 1.77754 | 1.78248 | 1.78741 | 1.79234 | 1.79728 | 1.80221 |
| 59 | 15 | 1.73502 | 1.73993 | 1.74484 | 1.74974 | 1.75465 | 1.75955 | 1.76446 | 1.76937 | 1.77427 | 1.77918 | 1.78408 | 1.78899 | 1.79390 |
| 60.8 | 16 | 1.72699 | 1.73188 | 1.73677 | 1.74166 | 1.74655 | 1.75144 | 1.75633 | 1.76122 | 1.76611 | 1.77100 | 1.77590 | 1.78078 | 1.78567 |
| 62.6 | 17 | 1.71888 | 1.72376 | 1.72862 | 1.73349 | 1.73836 | 1.74322 | 1.74809 | 1.75296 | 1.72783 | 1.76269 | 1.76756 | 1.77243 | 1.77729 |
| 64.4 | 18 | 1.71069 | 1.71554 | 1.72040 | 1.72525 | 1.73011 | 1.73497 | 1.73982 | 1.74468 | 1.74953 | 1.75439 | 1.75925 | 1.76410 | 1.76896 |
| 66.2 | 19 | 1.70239 | 1.70723 | 1.71207 | 1.71691 | 1.72175 | 1.72659 | 1.73143 | 1.73627 | 1.74111 | 1.74595 | 1.75078 | 1.75562 | 1.76046 |
| 68 | 20 | 1.6941 | 1.69894 | 1.70377 | 1.70859 | 1.71341 | 1.71823 | 1.72305 | 1.72788 | 1.73270 | 1.73725 | 1.74234 | 1.74716 | 1.75199 |
| 69.8 | 21 | 1.68571 | 1.69051 | 1.69532 | 1.70012 | 1.70493 | 1.70974 | 1.71454 | 1.71935 | 1.72415 | 1.72896 | 1.73377 | 1.73857 | 1.74338 |
| 71.6 | 22 | 1.67722 | 1.68201 | 1.68680 | 1.69151 | 1.69638 | 1.70117 | 1.70596 | 1.71075 | 1.71554 | 1.72033 | 1.72512 | 1.72991 | 1.73470 |
| 73.4 | 23 | 1.66862 | 1.67340 | 1.67817 | 1.68294 | 1.68772 | 1.69249 | 1.69727 | 1.70204 | 1.70681 | 1.71159 | 1.71636 | 1.72114 | 1.72591 |
| 75.2 | 24 | 1.65994 | 1.66470 | 1.66945 | 1.67421 | 1.67897 | 1.68372 | 1.68848 | 1.69324 | 1.69799 | 1.70275 | 1.70751 | 1.71227 | 1.71702 |
| 77 | 25 | 1.65113 | 1.65587 | 1.66061 | 1.66535 | 1.67009 | 1.67484 | 1.67958 | 1.68432 | 1.68906 | 1.69380 | 1.69854 | 1.70329 | 1.70803 |

WEIGHT OF CARBONIC ACID AT VARYING TEMPERATURES AND PRESSURES—*Continued.*

| Degrees | | 746 mm. 29.37 inches. | 748 mm. 29.45 inches. | 750 mm. 29.53 inches. | 752 mm. 29.61 inches. | 754 mm. 29.69 inches. | 756 mm. 29.76 inches. | 758 mm. 29.84 inches. | 760 mm. 29.92 inches. | 762 mm. 30.00 inches. | 764 mm. 30.08 inches. | 766 mm. 30.16 inches. | 768 mm. 30.24 inches. | 770 mm. 30.32 inches. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fahr. | Cent. | | | | | | | | | | | | | |
| 50 | 10 | 1.83936 | 1.84435 | 1.84934 | 1.85433 | 1.85933 | 1.86432 | 1.86931 | 1.87430 | 1.87930 | 1.88429 | 1.88928 | 1.89427 | 1.89926 |
| 51.8 | 11 | 1.83134 | 1.83631 | 1.84129 | 1.84626 | 1.85123 | 1.85621 | 1.86118 | 1.86616 | 1.87113 | 1.87610 | 1.88108 | 1.88605 | 1.89103 |
| 53.6 | 12 | 1.82324 | 1.82820 | 1.83315 | 1.83811 | 1.84307 | 1.84802 | 1.85298 | 1.85793 | 1.86289 | 1.86785 | 1.87280 | 1.87776 | 1.88271 |
| 55.4 | 13 | 1.81521 | 1.82015 | 1.82510 | 1.83004 | 1.83499 | 1.83993 | 1.84488 | 1.84982 | 1.85477 | 1.85971 | 1.86466 | 1.86960 | 1.87455 |
| 57.2 | 14 | 1.80714 | 1.81208 | 1.81701 | 1.82194 | 1.82687 | 1.83181 | 1.83674 | 1.84167 | 1.84661 | 1.85154 | 1.85647 | 1.86141 | 1.86634 |
| 59 | 15 | 1.79880 | 1.80371 | 1.80861 | 1.81352 | 1.81843 | 1.82333 | 1.82824 | 1.83314 | 1.83805 | 1.84296 | 1.84786 | 1.85277 | 1.85767 |
| 60.8 | 16 | 1.79056 | 1.79545 | 1.80034 | 1.80523 | 1.81012 | 1.81501 | 1.81990 | 1.82479 | 1.82938 | 1.83457 | 1.83946 | 1.84435 | 1.84924 |
| 62.6 | 17 | 2.78216 | 1.78703 | 1.79189 | 1.79676 | 1.80163 | 1.80650 | 1.81136 | 1.81623 | 1.82110 | 1.82596 | 1.83083 | 1.83570 | 1.84056 |
| 64.4 | 18 | 1.77381 | 1.77867 | 1.78353 | 1.78838 | 1.79324 | 1.70809 | 1.80295 | 1.80781 | 1.81266 | 1.81752 | 1.82337 | 1.82723 | 1.83209 |
| 66.2 | 19 | 1.76530 | 1.77014 | 1.77498 | 1.77982 | 1.78466 | 1.78950 | 1.79434 | 1.79917 | 1.80401 | 1.80885 | 1.81369 | 1.81853 | 1.82337 |
| 68 | 20 | 1.75681 | 1.76113 | 1.76645 | 1.77127 | 1.77610 | 1.78092 | 1.78574 | 1.79056 | 1.79538 | 1.80021 | 1.80503 | 1.80985 | 1.81467 |
| 69.8 | 21 | 1.74818 | 1.75299 | 1.75780 | 1.76260 | 1.76741 | 1.77221 | 1.77702 | 1.78183 | 1.78663 | 1.79144 | 1.79624 | 1.80105 | 1.80586 |
| 71.6 | 22 | 1.73949 | 1.74428 | 1.74907 | 1.75386 | 1.75865 | 1.76344 | 1.76823 | 1.77302 | 1.77781 | 1.78260 | 1.78739 | 1.79218 | 1.79697 |
| 73 4 | 23 | 1.73068 | 1.73546 | 1.74023 | 1.74501 | 1.74978 | 1.75455 | 1.75933 | 1.76410 | 1.76888 | 1.77675 | 1.77842 | 1.78320 | 1.78797 |
| 75.2 | 24 | 1.72178 | 1.72654 | 1.73129 | 1.73605 | 1.74081 | 1.74556 | 1.75032 | 1.75508 | 1.75981 | 1.76459 | 1.76935 | 1.77411 | 1.77886 |
| 77 | 25 | 1.71277 | 1.71751 | 1.72225 | 1.72699 | 1.73173 | 1.73648 | 1.74122 | 1.74596 | 1.75070 | 1.75544 | 1.76018 | 1.76492 | 1.76967 |

### TABLE OF THE ABSORPTION OF NITROGEN GAS IN 60 C.C. OF LIQUID (50 C.C. OF HYPOCHLORITE SOLUTION AND 10 C.C. OF WATER) HAVING A SPECIFIC GRAVITY OF 1.1 AND 50 C.C., EVOLVING 200 MM. OF NITROGEN.

| Ev. | Absorbed. | Evolved. | Absorbed. | Evolved. | Absorbed. | Evolved. | Absorbed. | Evolved. | Absorbed |
|---|---|---|---|---|---|---|---|---|---|
| 1 | .06 | 21 | .56 | 41 | 1.06 | 61 | 1.56 | 81 | 2.06 |
| 2 | .08 | 22 | .58 | 42 | 1.08 | 62 | 1.58 | 82 | 2.08 |
| 3 | .11 | 23 | .61 | 43 | 1.11 | 63 | 1.61 | 83 | 2.11 |
| 4 | .13 | 24 | .63 | 44 | 1.13 | 64 | 1.63 | 84 | 2.13 |
| 5 | .16 | 25 | .06 | 45 | 1.16 | 65 | 1.66 | 85 | 2.16 |
| 6 | .18 | 26 | .68 | 46 | 1.18 | 66 | 1.68 | 86 | 2.18 |
| 7 | .21 | 27 | .71 | 47 | 1.21 | 67 | 1.71 | 87 | 2.21 |
| 8 | .23 | 28 | .73 | 48 | 1.23 | 68 | 1.73 | 88 | 2.23 |
| 9 | .26 | 29 | .76 | 49 | 1.26 | 69 | 1.76 | 89 | 2.26 |
| 10 | .28 | 30 | .78 | 50 | 1.28 | 70 | 1.78 | 90 | 2.28 |
| 11 | .31 | 31 | .81 | 51 | 1.31 | 71 | 1.81 | 91 | 2.31 |
| 12 | .33 | 32 | .83 | 52 | 1.33 | 72 | 1.83 | 92 | 2.33 |
| 13 | .36 | 33 | .86 | 53 | 1.36 | 73 | 1.86 | 93 | 2.36 |
| 14 | .38 | 34 | .88 | 54 | 1.38 | 74 | 1.88 | 94 | 2.38 |
| 15 | .41 | 35 | .91 | 55 | 1.41 | 75 | 1.91 | 95 | 2.41 |
| 16 | .43 | 36 | .93 | 56 | 1.43 | 76 | 1.93 | 96 | 2.43 |
| 17 | .46 | 37 | .96 | 57 | 1.46 | 77 | 1.96 | 97 | 2.46 |
| 18 | .48 | 38 | .98 | 58 | 1.48 | 78 | 1.98 | 98 | 2.48 |
| 19 | .51 | 39 | 1.01 | 59 | 1,51 | 79 | 2.01 | 99 | 2.51 |
| 20 | .53 | 40 | 1.03 | 60 | 1,53 | 80 | 2.03 | 100 | 2.53 |

## WEIGHT OF 1 C.C. OF NITROGEN IN MILLIGRAMS FOR VARIATIONS OF TEMPERATURE AND PRESSURE.

| Degrees | | 726 mm. 28.58 inches. | 727 mm. 28.62 inches. | 728 mm. 28.66 inches. | 729 mm. 28.70 inches. | 730 mm. 28.74 inches. | 731 mm. 28.78 inches. | 732 mm. 28.82 inches. | 733 mm. 28.86 inches. | 734 mm. 28.90 inches. |
|---|---|---|---|---|---|---|---|---|---|---|
| Fahr. | Cent. | | | | | | | | | |
| 32 | 0 | 1.1927 | 1.1944 | 1.1960 | 1.1977 | 1.1993 | 1.2010 | 1.2026 | 1.2043 | 1.2059 |
| 33.8 | 1 | 1.1879 | 1.1895 | 1.1912 | 1.1928 | 1.1945 | 1.1961 | 1.1978 | 1.1994 | 1.2011 |
| 35.6 | 2 | 1.1829 | 1.1846 | 1.1862 | 1.1879 | 1.1895 | 1.1911 | 1.1928 | 1.1944 | 1.1961 |
| 37.4 | 3 | 1.1781 | 1.1797 | 1.1814 | 1.1830 | 1.1846 | 1.1863 | 1.1879 | 1.1895 | 1.1912 |
| 39.2 | 4 | 1.1731 | 1.1748 | 1.1764 | 1.1780 | 1.1797 | 1.1813 | 1.1829 | 1.1845 | 1.1862 |
| 41 | 5 | 1.1682 | 1.1698 | 1.1714 | 1.1731 | 1.1747 | 1.1763 | 1.1779 | 1.1796 | 1.1812 |
| 42.8 | 6 | 1.1632 | 1.1649 | 1.1665 | 1.1681 | 1.1697 | 1.1713 | 1.1729 | 1.1746 | 1.1762 |
| 44.6 | 7 | 1.1583 | 1.1599 | 1.1615 | 1.1631 | 1.1647 | 1.1664 | 1.1680 | 1.1696 | 1.1712 |
| 46.4 | 8 | 1.1533 | 1.1549 | 1.1566 | 1.1582 | 1.1598 | 1.1614 | 1.1630 | 1.1646 | 1.1662 |
| 48.2 | 9 | 1.1484 | 1.1500 | 1.1516 | 1.1532 | 1.1548 | 1.1564 | 1.1580 | 1.1596 | 1.1612 |
| 50 | 10 | 1.1433 | 1.1449 | 1.1465 | 1.1481 | 1.1497 | 1.1513 | 1.1529 | 1.1545 | 1.1561 |
| 51.8 | 11 | 1.1384 | 1.1400 | 1.1416 | 1.1432 | 1.1448 | 1.1463 | 1.1479 | 1.1495 | 1.1511 |
| 53.6 | 12 | 1.1332 | 1.1348 | 1.1364 | 1.1380 | 1.1396 | 1.1412 | 1.1427 | 1.1443 | 1.1459 |
| 55.4 | 13 | 1.1282 | 1.1298 | 1.1314 | 1.1329 | 1.1345 | 1.1361 | 1.1377 | 1.1392 | 1.1408 |
| 57.2 | 14 | 1.1231 | 1.1247 | 1.1263 | 1.1279 | 1.1294 | 1.1310 | 1.1326 | 1.1342 | 1.1357 |
| 59 | 15 | 1.1180 | 1.1196 | 1.1211 | 1.1227 | 1.1243 | 1.1258 | 1.1274 | 1.1290 | 1.1305 |
| 60.8 | 16 | 1.1128 | 1.1144 | 1.1160 | 1.1175 | 1.1191 | 1.1207 | 1.1222 | 1.1238 | 1.1253 |
| 62.6 | 17 | 1.1077 | 1.1092 | 1.1108 | 1.1124 | 1.1139 | 1.1155 | 1.1170 | 1.1186 | 1.1201 |
| 64.4 | 18 | 1.1023 | 1.1039 | 1.1054 | 1.1070 | 1.1085 | 1.1101 | 1.1116 | 1.1132 | 1.1147 |
| 66.2 | 19 | 1.0971 | 1.0986 | 1.1002 | 1.1017 | 1.1033 | 1.1048 | 1.1064 | 1.1079 | 1.1095 |
| 68 | 20 | 1.0917 | 1.0933 | 1.0948 | 1.0964 | 1.0979 | 1.0994 | 1.1010 | 1.1025 | 1.1041 |
| 69.8 | 21 | 1.0863 | 1.0878 | 1.0894 | 1.0900 | 1.0924 | 1.0940 | 1.0955 | 1.0970 | 1.0986 |
| 71.6 | 22 | 1.0808 | 1.0824 | 1.0839 | 1.0854 | 1.0869 | 1.0885 | 1.0900 | 1.0915 | 1.0931 |
| 73.4 | 23 | 1.0753 | 1.0768 | 1.0783 | 1.0799 | 1.0814 | 1.0829 | 1.0844 | 1.0860 | 1.0875 |
| 75.2 | 24 | 1.0697 | 1.0712 | 1.0728 | 1.0743 | 1.0758 | 1.0773 | 1.0788 | 1.0804 | 1.0819 |
| 77 | 25 | 1.0640 | 1.0655 | 1.0670 | 1.0685 | 1.0700 | 1.0715 | 1.0731 | 1.0746 | 1.0761 |
| 78.8 | 26 | 1.0583 | 1.0598 | 1.0613 | 1.0628 | 1.0644 | 1.0659 | 1.0674 | 1.0689 | 1.0704 |
| 80.6 | 27 | 1.0526 | 1.0541 | 1.0556 | 1.0571 | 1.0586 | 1.0601 | 1.0616 | 1.0631 | 1.0646 |
| 82.4 | 28 | 1.0467 | 1.0482 | 1.0497 | 1.0512 | 1.0527 | 1.0542 | 1.0557 | 1.0572 | 1.0587 |
| 84.2 | 29 | 1.0406 | 1.0421 | 1.0436 | 1.0451 | 1.0466 | 1.0481 | 1.0496 | 1.0511 | 1.0526 |
| 86 | 30 | 1.0347 | 1.0362 | 1.0377 | 1.0392 | 1.0407 | 1.0421 | 1.0436 | 1.0451 | 1.0466 |
| 87.8 | 31 | 1.0285 | 1.0300 | 1.0315 | 1.0329 | 1.0344 | 1.0359 | 1.0374 | 1.0389 | 1.0404 |
| 89.6 | 32 | 1.0222 | 1.0237 | 1.0251 | 1.0266 | 1.0281 | 1.0296 | 1.0311 | 1.0325 | 1.0340 |
| 91.4 | 33 | 1.0159 | 1.0174 | 1.0188 | 1.0203 | 1.0218 | 1.0233 | 1.0247 | 1.0262 | 1.0277 |
| 93.2 | 34 | 1.0093 | 1.0107 | 1.0122 | 1.0137 | 1.0152 | 1.0166 | 1.0181 | 1.0196 | 1.0210 |
| 95 | 35 | 1.0028 | 1.0042 | 1.0057 | 1.0072 | 1.0086 | 1.0101 | 1.0116 | 1.0130 | 1.0145 |

NITROGEN TABLE—*Continued.*

| Degrees | | 735 mm. 28.94 inches. | 736 mm. 28.98 inches. | 737 mm. 29.02 inches. | 738 mm. 29.06 inches. | 739 mm. 29.09 inches. | 740 mm. 29.13 inches. | 741 mm. 29.17 inches. | 742 mm. 29.21 inches. | 743 mm. 29.25 inches. |
|---|---|---|---|---|---|---|---|---|---|---|
| Fahr. | Cent. | | | | | | | | | |
| 32 | 0 | 1.2076 | 1.2092 | 1.2109 | 1.2125 | 1.2142 | 1.2158 | 1.2175 | 1.2192 | 1.2208 |
| 33.8 | 1 | 1.2027 | 1.2043 | 1.2060 | 1.2076 | 1.2093 | 1.2109 | 1.2126 | 1.2142 | 1.2159 |
| 35.6 | 2 | 1.1977 | 1.1993 | 1.2010 | 1.2026 | 1.2043 | 1.2059 | 1.2075 | 1.2092 | 1.2108 |
| 37.4 | 3 | 1.1928 | 1.1944 | 1.1961 | 1.1977 | 1.1993 | 1.2010 | 1.2025 | 1.2041 | 1.2058 |
| 39.2 | 4 | 1.1878 | 1.1894 | 1.1911 | 1.1927 | 1.1943 | 1.1959 | 1.1976 | 1.1992 | 1.2008 |
| 41 | 5 | 1.1828 | 1.1844 | 1.1860 | 1.1877 | 1.1893 | 1.1909 | 1.1925 | 1.1942 | 1.1958 |
| 42.8 | 6 | 1.1778 | 1.1794 | 1.1810 | 1.1827 | 1.1843 | 1.1859 | 1.1875 | 1.1891 | 1.1907 |
| 44.6 | 7 | 1.1728 | 1.1744 | 1.1760 | 1.1776 | 1.1792 | 1.1809 | 1.1825 | 1.1841 | 1.1857 |
| 46.4 | 8 | 1.1678 | 1.1694 | 1.1710 | 1.1726 | 1.1742 | 1.1758 | 1.1774 | 1.1790 | 1.1807 |
| 48.2 | 9 | 1.1628 | 1.1644 | 1.1660 | 1.1676 | 1.1692 | 1.1708 | 1.1724 | 1.1740 | 1.1756 |
| 50 | 10 | 1.1577 | 1.1593 | 1.1609 | 1.1625 | 1.1641 | 1.1657 | 1.1673 | 1.1689 | 1.1705 |
| 51.8 | 11 | 1.1527 | 1.1543 | 1.1559 | 1.1575 | 1.1591 | 1.1606 | 1.1622 | 1.1638 | 1.1654 |
| 53.6 | 12 | 1.1475 | 1.1491 | 1.1507 | 1.1523 | 1.1538 | 1.1554 | 1.1570 | 1.1586 | 1.1602 |
| 55.4 | 13 | 1.1424 | 1.1440 | 1.1456 | 1.1471 | 1.1487 | 1.1503 | 1.1519 | 1.1534 | 1.1550 |
| 57.2 | 14 | 1.1373 | 1.1389 | 1.1404 | 1.1420 | 1.1436 | 1.1452 | 1.1467 | 1.1483 | 1.1499 |
| 59 | 15 | 1.1321 | 1.1337 | 1.1352 | 1.1368 | 1.1384 | 1.1399 | 1.1415 | 1.1431 | 1.1446 |
| 60.8 | 16 | 1.1269 | 1.1285 | 1.1300 | 1.1316 | 1.1331 | 1.1347 | 1.1363 | 1.1378 | 1.1394 |
| 62.6 | 17 | 1.1217 | 1.1233 | 1.1248 | 1.1264 | 1.1279 | 1.1295 | 1.1310 | 1.1326 | 1.1342 |
| 64.4 | 18 | 1.1163 | 1.1179 | 1.1194 | 1.1210 | 1.1225 | 1.1241 | 1.1256 | 1.1272 | 1.1287 |
| 66.2 | 19 | 1.1110 | 1.1125 | 1.1141 | 1.1156 | 1.1172 | 1.1187 | 1.1203 | 1.1218 | 1.1234 |
| 68 | 20 | 1.1056 | 1.1071 | 1.1087 | 1.1102 | 1.1118 | 1.1133 | 1.1148 | 1.1164 | 1.1179 |
| 69.8 | 21 | 1.1001 | 1.1016 | 1.1032 | 1.1047 | 1.1062 | 1.1078 | 1.1093 | 1.1108 | 1.1124 |
| 71.6 | 22 | 1.0946 | 1.0961 | 1.0977 | 1.0992 | 1.1007 | 1.1023 | 1.1038 | 1.1053 | 1.1068 |
| 73.4 | 23 | 1.0890 | 1.0905 | 1.0921 | 1.0936 | 1.0951 | 1.0966 | 1.0982 | 1.0997 | 1.1012 |
| 75.2 | 24 | 1.0834 | 1.0849 | 1.0864 | 1.0880 | 1.0895 | 1.0910 | 1.0925 | 1.0940 | 1.0956 |
| 77 | 25 | 1.0776 | 1.0791 | 1.0806 | 1.0821 | 1.0837 | 1.0852 | 1.0867 | 1.0882 | 1.0897 |
| 78.8 | 26 | 1.0719 | 1.0734 | 1.0749 | 1.0764 | 1.0779 | 1.0794 | 1.0810 | 1.0825 | 1.0840 |
| 80.6 | 27 | 1.0661 | 1.0676 | 1.0691 | 1.0706 | 1.0721 | 1.0736 | 1.0751 | 1.0766 | 1.0781 |
| 82.4 | 28 | 1.0602 | 1.0617 | 1.0632 | 1.0647 | 1.0662 | 1.0677 | 1.0692 | 1.0707 | 1.0722 |
| 84.2 | 29 | 1.0541 | 1.0556 | 1.0571 | 1.0586 | 1.0601 | 1.0616 | 1.0631 | 1.0646 | 1.0661 |
| 86 | 30 | 1.0481 | 1.0496 | 1.0511 | 1.0526 | 1.0541 | 1.0555 | 1.0570 | 1.0585 | 1.0600 |
| 87.8 | 31 | 1.0419 | 1.0433 | 1.0448 | 1.0463 | 1.0478 | 1.0493 | 1.0508 | 1.0522 | 1.0537 |
| 89.6 | 32 | 1.0355 | 1.0370 | 1.0385 | 1.0399 | 1.0414 | 1.0429 | 1.0444 | 1.0459 | 1.0473 |
| 91.4 | 33 | 1.0292 | 1.0306 | 1.0321 | 1.0336 | 1.0351 | 1.0365 | 1.0380 | 1.0395 | 1.0410 |
| 93.2 | 34 | 1.0225 | 1.0240 | 1.0254 | 1.0269 | 1.0284 | 1.0299 | 1.0313 | 1.0328 | 1.0343 |
| 95 | 35 | 1.0160 | 1.0174 | 1.0189 | 1.0204 | 1.0218 | 1.0233 | 1.0248 | 1.0262 | 1.0277 |

NITROGEN TABLE—*Continued.*

| Degrees | | 744 mm. 29.29 inches. | 745 mm. 29.33 inches. | 746 mm. 29.37 inches. | 747 mm. 29.41 inches. | 748 mm. 29.45 inches. | 749 mm. 29.49 inches. | 750 mm. 29.53 inches. | 751 mm. 29.57 inches. | 752 mm. 29.61 inches. |
|---|---|---|---|---|---|---|---|---|---|---|
| Fahr. | Cent. | | | | | | | | | |
| 32 | 0 | 1.2225 | 1.2241 | 1.2258 | 1.2274 | 1.2291 | 1.2307 | 1.2324 | 1.2340 | 1.2357 |
| 33.8 | 1 | 1.2175 | 1.2192 | 1.2208 | 1.2225 | 1.2241 | 1.2258 | 1.2274 | 1.2291 | 1.2307 |
| 35.6 | 2 | 1.2125 | 1.2141 | 1.2158 | 1.2174 | 1.2190 | 1.2207 | 1.2223 | 1.2240 | 1.2256 |
| 37.4 | 3 | 1.2074 | 1.2090 | 1.2107 | 1.2123 | 1.2140 | 1.2156 | 1.2172 | 1.2189 | 1.2205 |
| 39.2 | 4 | 1.2025 | 1.2041 | 1.2057 | 1.2074 | 1.2090 | 1.2106 | 1.2122 | 1.2139 | 1.2155 |
| 41 | 5 | 1.1974 | 1.1990 | 1.2007 | 1.2023 | 1.2039 | 1.2055 | 1.2072 | 1.2088 | 1.2104 |
| 42.8 | 6 | 1.1924 | 1.1940 | 1.1956 | 1.1972 | 1.1988 | 1.2005 | 1.2021 | 1.2037 | 1.2053 |
| 44.6 | 7 | 1.1873 | 1.1889 | 1.1905 | 1.1921 | 1.1938 | 1.1954 | 1.1970 | 1.1986 | 1.2002 |
| 46.4 | 8 | 1.1823 | 1.1839 | 1.1855 | 1.1871 | 1.1887 | 1.1903 | 1.1919 | 1.1935 | 1.1951 |
| 48.2 | 9 | 1.1772 | 1.1788 | 1.1804 | 1.1820 | 1.1836 | 1.1852 | 1.1868 | 1.1884 | 1.1900 |
| 50 | 10 | 1.1721 | 1.1737 | 1.1753 | 1.1769 | 1.1784 | 1.1800 | 1.1816 | 1.1832 | 1.1848 |
| 51.8 | 11 | 1.1670 | 1.1686 | 1.1702 | 1.1718 | 1.1734 | 1.1750 | 1.1765 | 1.1781 | 1.1797 |
| 53.6 | 12 | 1.1618 | 1.1633 | 1.1649 | 1.1665 | 1.1681 | 1.1697 | 1.1713 | 1.1728 | 1.1744 |
| 55.4 | 13 | 1.1566 | 1.1582 | 1.1598 | 1.1613 | 1.1629 | 1.1645 | 1.1661 | 1.1677 | 1.1692 |
| 57.2 | 14 | 1.1515 | 1.1530 | 1.1546 | 1.1562 | 1.1577 | 1.1593 | 1.1609 | 1.1625 | 1.1640 |
| 59 | 15 | 1.1462 | 1.1478 | 1.1493 | 1.1509 | 1.1525 | 1.1540 | 1.1556 | 1.1572 | 1.1587 |
| 60.8 | 16 | 1.1410 | 1.1425 | 1.1441 | 1.1456 | 1.1472 | 1.1488 | 1.1503 | 1.1519 | 1.1535 |
| 62.6 | 17 | 1.1357 | 1.1373 | 1.1388 | 1.1404 | 1.1419 | 1.1435 | 1.1450 | 1.1466 | 1.1482 |
| 64.4 | 18 | 1.1303 | 1.1318 | 1.1334 | 1.1349 | 1.1365 | 1.1380 | 1.1396 | 1.1411 | 1.1427 |
| 66.2 | 19 | 1.1249 | 1.1265 | 1.1280 | 1.1296 | 1.1311 | 1.1326 | 1.1342 | 1.1357 | 1.1373 |
| 68 | 20 | 1.1195 | 1.1210 | 1.1225 | 1.1241 | 1.1256 | 1.1272 | 1.1287 | 1.1303 | 1.1318 |
| 69.8 | 21 | 1.1139 | 1.1155 | 1.1170 | 1.1185 | 1.1201 | 1.1216 | 1.1231 | 1.1247 | 1.1262 |
| 71.6 | 22 | 1.1084 | 1.1099 | 1.1114 | 1.1130 | 1.1145 | 1.1160 | 1.1176 | 1.1191 | 1.1206 |
| 73.4 | 23 | 1.1027 | 1.1043 | 1.1058 | 1.1073 | 1.1088 | 1.1103 | 1.1119 | 1.1134 | 1.1149 |
| 75.2 | 24 | 1.0971 | 1.0986 | 1.1001 | 1.1016 | 1.1032 | 1.1047 | 1.1062 | 1.1077 | 1.1092 |
| 77 | 25 | 1.0912 | 1.0927 | 1.0943 | 1.0958 | 1.0973 | 1.0988 | 1.1003 | 1.1018 | 1.1034 |
| 78.8 | 26 | 1.0855 | 1.0870 | 1.0885 | 1.0900 | 1.0915 | 1.0930 | 1.0945 | 1.0961 | 1.0976 |
| 80.6 | 27 | 1.0796 | 1.0811 | 1.0827 | 1.0842 | 1.0857 | 1.0872 | 1.0887 | 1.0902 | 1.0917 |
| 82.4 | 28 | 1.0737 | 1.0752 | 1.0767 | 1.0782 | 1.0797 | 1.0812 | 1.0827 | 1.0842 | 1.0857 |
| 84.2 | 29 | 1.0676 | 1.0690 | 1.0705 | 1.0720 | 1.0735 | 1.0750 | 1.0765 | 1.0780 | 1.0795 |
| 86 | 30 | 1.0615 | 1.0630 | 1.0645 | 1.0660 | 1.0675 | 1.0690 | 1.0704 | 1.0719 | 1.0734 |
| 87.8 | 31 | 1.0552 | 1.0567 | 1.0582 | 1.0597 | 1.0612 | 1.0626 | 1.0641 | 1.0656 | 1.0671 |
| 89.6 | 32 | 1.0488 | 1.0503 | 1.0518 | 1.0533 | 1.0547 | 1.0562 | 1.0577 | 1.0592 | 1.0607 |
| 91.4 | 33 | 1.0424 | 1.0439 | 1.0454 | 1.0469 | 1.0483 | 1.0498 | 1.0513 | 1.0528 | 1.0542 |
| 93.2 | 34 | 1.0357 | 1.0372 | 1.0387 | 1.0401 | 1.0416 | 1.0431 | 1.0446 | 1.0460 | 1.0475 |
| 95 | 35 | 1.0291 | 1.0306 | 1.0321 | 1.0335 | 1.0350 | 1.0365 | 1.0379 | 1.0394 | 1.0409 |

## NITROGEN TABLE—*Continued.*

| Degrees | | 753 mm. | 754 mm. | 755 mm. | 756 mm. | 757 mm. | 758 mm. | 759 mm. | 760 mm. | 761 mm. |
|---|---|---|---|---|---|---|---|---|---|---|
| Fahr. | Cent. | 29.65 inches. | 29.69 inches. | 29.72 inches. | 29.76 inches. | 29.80 inches. | 29.84 inches. | 29.88 inches. | 29.92 inches. | 29.96 inches. |
| 32 | 0 | 1.2373 | 1.2390 | 1.2406 | 1.2423 | 1.2440 | 1.2456 | 1.2473 | 1.2489 | 1.2506 |
| 33.8 | 1 | 1.2324 | 1.2340 | 1.2356 | 1.2373 | 1.2389 | 1.2406 | 1.2422 | 1.2439 | 1.2455 |
| 35.6 | 2 | 1.2272 | 1.2289 | 1.2305 | 1.2322 | 1.2338 | 1.2355 | 1.2371 | 1.2387 | 1.2404 |
| 37.4 | 3 | 1.2221 | 1.2238 | 1.2254 | 1.2270 | 1.2287 | 1.2303 | 1.2320 | 1.2336 | 1.2352 |
| 39.2 | 4 | 1.2171 | 1.2188 | 1.2204 | 1.2220 | 1.2237 | 1.2253 | 1.2269 | 1.2285 | 1.2302 |
| 41 | 5 | 1.2120 | 1.2137 | 1.2153 | 1.2169 | 1.2185 | 1.2202 | 1.2218 | 1.2234 | 1.2250 |
| 42.8 | 6 | 1.2069 | 1.2085 | 1.2102 | 1.2118 | 1.2134 | 1.2150 | 1.2166 | 1.2182 | 1.2199 |
| 44.6 | 7 | 1.2018 | 1.2034 | 1.2051 | 1.2067 | 1.2083 | 1.2099 | 1.2115 | 1.2131 | 1.2147 |
| 46.4 | 8 | 1.1967 | 1.1983 | 1.1999 | 1.2015 | 1.2031 | 1.2047 | 1.2064 | 1.2080 | 1.2096 |
| 48.2 | 9 | 1.1916 | 1.1932 | 1.1948 | 1.1964 | 1.1980 | 1.1996 | 1.2012 | 1.2028 | 1.2044 |
| 50 | 10 | 1.1864 | 1.1880 | 1.1896 | 1.1912 | 1.1928 | 1.1944 | 1.1960 | 1.1976 | 1.1992 |
| 51.8 | 11 | 1.1813 | 1.1829 | 1.1845 | 1.1861 | 1.1877 | 1.1893 | 1.1909 | 1.1924 | 1.1940 |
| 53.6 | 12 | 1.1760 | 1.1776 | 1.1792 | 1.1808 | 1.1823 | 1.1839 | 1.1855 | 1.1871 | 1.1887 |
| 55.4 | 13 | 1.1708 | 1.1724 | 1.1740 | 1.1755 | 1.1771 | 1.1787 | 1.1803 | 1.1819 | 1.1834 |
| 57.2 | 14 | 1.1656 | 1.1672 | 1.1687 | 1.1703 | 1.1719 | 1.1735 | 1.1750 | 1.1766 | 1.1782 |
| 59 | 15 | 1.1603 | 1.1619 | 1.1634 | 1.1650 | 1.1666 | 1.1681 | 1.1697 | 1.1713 | 1.1729 |
| 60.8 | 16 | 1.1550 | 1.1566 | 1.1581 | 1.1597 | 1.1613 | 1.1628 | 1.1644 | 1.1660 | 1.1675 |
| 62.6 | 17 | 1.1497 | 1.1513 | 1.1528 | 1.1544 | 1.1559 | 1.1575 | 1.1591 | 1.1606 | 1.1622 |
| 64.4 | 18 | 1.1442 | 1.1458 | 1.1473 | 1.1489 | 1.1504 | 1.1520 | 1.1535 | 1.1551 | 1.1566 |
| 66.2 | 19 | 1.1388 | 1.1404 | 1.1419 | 1.1435 | 1.1450 | 1.1466 | 1.1481 | 1.1496 | 1.1512 |
| 68 | 20 | 1.1333 | 1.1349 | 1.1364 | 1.1380 | 1.1395 | 1.1410 | 1.1426 | 1.1441 | 1.1457 |
| 69.8 | 21 | 1.1277 | 1.1293 | 1.1308 | 1.1323 | 1.1339 | 1.1354 | 1.1369 | 1.1385 | 1.1400 |
| 71.6 | 22 | 1.1221 | 1.1237 | 1.1252 | 1.1267 | 1.1283 | 1.1298 | 1.1313 | 1.1329 | 1.1344 |
| 73.4 | 23 | 1.1164 | 1.1180 | 1.1195 | 1.1210 | 1.1225 | 1.1241 | 1.1256 | 1.1271 | 1.1286 |
| 75.2 | 24 | 1.1108 | 1.1123 | 1.1138 | 1.1153 | 1.1168 | 1.1184 | 1.1199 | 1.1214 | 1.1229 |
| 77 | 25 | 1.1049 | 1.1064 | 1.1079 | 1.1094 | 1.1109 | 1.1124 | 1.1140 | 1.1155 | 1.1170 |
| 78.8 | 26 | 1.0991 | 1.1006 | 1.1021 | 1.1036 | 1.1051 | 1.1066 | 1.1081 | 1.1096 | 1.1112 |
| 80.6 | 27 | 1.0932 | 1.0947 | 1.0962 | 1.0977 | 1.0992 | 1.1007 | 1.1022 | 1.1037 | 1.1052 |
| 82.4 | 28 | 1.0872 | 1.0887 | 1.0902 | 1.0917 | 1.0932 | 1.0947 | 1.0962 | 1.0977 | 1.0992 |
| 84.2 | 29 | 1.0810 | 1.0825 | 1.0840 | 1.0855 | 1.0870 | 1.0885 | 1.0900 | 1.0915 | 1.0930 |
| 86 | 30 | 1.0749 | 1.0764 | 1.0779 | 1.0794 | 1.0809 | 1.0824 | 1.0839 | 1.0853 | 1.0868 |
| 87.8 | 31 | 1.0686 | 1.0701 | 1.0716 | 1.0730 | 1.0745 | 1.0760 | 1.0775 | 1.0790 | 1.0805 |
| 89.6 | 32 | 1.0621 | 1.0636 | 1.0651 | 1.0666 | 1.0681 | 1.0695 | 1.0710 | 1.0725 | 1.0740 |
| 91.4 | 33 | 1.0557 | 1.0572 | 1.0587 | 1.0601 | 1.0616 | 1.0631 | 1.0646 | 1.0660 | 1.0675 |
| 93.2 | 34 | 1.0490 | 1.0505 | 1.0519 | 1.0534 | 1.0549 | 1.0563 | 1.0578 | 1.0593 | 1.0607 |
| 95 | 35 | 1.0423 | 1.0438 | 1.0453 | 1.0467 | 1.0482 | 1.0497 | 1.0511 | 1.0526 | 1.0541 |

NITROGEN TABLE—*Continued.*

| Degrees | | 762 mm. 30.00 inches. | 763 mm. 30.04 inches. | 764 mm. 30.08 inches. | 765 mm. 30.12 inches. | 766 mm. 30.16 inches. | 767 mm. 30.20 inches. | 768 mm. 30.24 inches. | 769 mm. 30.28 inches. | 770 mm. 30.32 inches. |
|---|---|---|---|---|---|---|---|---|---|---|
| Fahr. | Cent. | | | | | | | | | |
| 32 | 0 | 1.2522 | 1.2539 | 1.2555 | 1.2572 | 1.2588 | 1.2605 | 1.2621 | 1.2638 | 1.2654 |
| 33.8 | 1 | 1.2472 | 1.2488 | 1.2505 | 1.2521 | 1.2538 | 1.2554 | 1.2571 | 1.2587 | 1.2604 |
| 35.6 | 2 | 1.2420 | 1.2437 | 1.2453 | 1.2469 | 1.2486 | 1.2502 | 1.2519 | 1.2535 | 1.2551 |
| 37.4 | 3 | 1.2369 | 1.2385 | 1.2401 | 1.2418 | 1.2434 | 1.2450 | 1.2467 | 1.2483 | 1.2499 |
| 39.2 | 4 | 1.2318 | 1.2334 | 1.2351 | 1.2367 | 1.2383 | 1.2399 | 1.2416 | 1.2432 | 1.2448 |
| 41 | 5 | 1.2267 | 1.2283 | 1.2299 | 1.2315 | 1.2332 | 1.2348 | 1.2364 | 1.2380 | 1.2397 |
| 42.8 | 6 | 1.2215 | 1.2231 | 1.2247 | 1.2263 | 1.2279 | 1.2296 | 1.2312 | 1.2328 | 1.2344 |
| 44.6 | 7 | 1.2163 | 1.2179 | 1.2196 | 1.2212 | 1.2228 | 1.2244 | 1.2260 | 1.2276 | 1.2292 |
| 46.4 | 8 | 1.2112 | 1.2128 | 1.2144 | 1.2160 | 1.2176 | 1.2192 | 1.2208 | 1.2224 | 1.2240 |
| 48.2 | 9 | 1.2060 | 1.2076 | 1.2092 | 1.2108 | 1.2124 | 1.2140 | 1.2156 | 1.2172 | 1.2188 |
| 50 | 10 | 1.2008 | 1.2024 | 1.2040 | 1.2056 | 1.2072 | 1.2088 | 1.2103 | 1.2119 | 1.2135 |
| 51.8 | 11 | 1.1956 | 1.1972 | 1.1988 | 1.2004 | 1.2020 | 1.2036 | 1.2052 | 1.2067 | 1.2083 |
| 53.6 | 12 | 1.1903 | 1.1918 | 1.1934 | 1.1950 | 1.1966 | 1.1982 | 1.1998 | 1.2013 | 1.2029 |
| 55.4 | 13 | 1.1850 | 1.1866 | 1.1882 | 1.1897 | 1.1913 | 1.1929 | 1.1945 | 1.1961 | 1.1976 |
| 57.2 | 14 | 1.1798 | 1.1813 | 1.1829 | 1.1845 | 1.1860 | 1.1876 | 1.1892 | 1.1908 | 1.1923 |
| 59 | 15 | 1.1744 | 1.1760 | 1.1776 | 1.1791 | 1.1807 | 1.1823 | 1.1838 | 1.1854 | 1.1870 |
| 60.8 | 16 | 1.1691 | 1.1706 | 1.1722 | 1.1738 | 1.1753 | 1.1769 | 1.1784 | 1.1800 | 1.1816 |
| 62.6 | 17 | 1.1637 | 1.1653 | 1.1668 | 1.1684 | 1.1700 | 1.1715 | 1.1731 | 1.1746 | 1.1762 |
| 64.4 | 18 | 1.1582 | 1.1597 | 1.1613 | 1.1628 | 1.1644 | 1.1659 | 1.1675 | 1.1690 | 1.1706 |
| 66.2 | 19 | 1.1527 | 1.1543 | 1.1558 | 1.1574 | 1.1589 | 1.1605 | 1.1620 | 1.1636 | 1.1651 |
| 68 | 20 | 1.1472 | 1.1487 | 1.1503 | 1.1518 | 1.1534 | 1.1549 | 1.1564 | 1.1580 | 1.1595 |
| 69.8 | 21 | 1.1416 | 1.1431 | 1.1446 | 1.1462 | 1.1477 | 1.1492 | 1.1508 | 1.1523 | 1.1538 |
| 71.6 | 22 | 1.1359 | 1.1374 | 1.1390 | 1.1405 | 1.1420 | 1.1436 | 1.1451 | 1.1466 | 1.1482 |
| 73.4 | 23 | 1.1302 | 1.1317 | 1.1332 | 1.1347 | 1.1363 | 1.1378 | 1.1393 | 1.1408 | 1.1424 |
| 75.2 | 24 | 1.1244 | 1.1260 | 1.1275 | 1.1290 | 1.1305 | 1.1320 | 1.1336 | 1.1351 | 1.1366 |
| 77 | 25 | 1.1185 | 1.1200 | 1.1215 | 1.1230 | 1.1246 | 1.1261 | 1.1276 | 1.1291 | 1.1306 |
| 78.8 | 26 | 1.1127 | 1.1142 | 1.1157 | 1.1172 | 1.1187 | 1.1202 | 1.1217 | 1.1232 | 1.1247 |
| 80.6 | 27 | 1.1067 | 1.1082 | 1.1097 | 1.1112 | 1.1127 | 1.1142 | 1.1157 | 1.1172 | 1.1188 |
| 82.4 | 28 | 1.1007 | 1.1022 | 1.1037 | 1.1052 | 1.1067 | 1.1082 | 1.1097 | 1.1112 | 1.1127 |
| 84.2 | 29 | 1.0945 | 1.0960 | 1.0974 | 1.0989 | 1.1004 | 1.1019 | 1.1034 | 1.1049 | 1.1064 |
| 86 | 30 | 1.0883 | 1.0898 | 1.0913 | 1.0928 | 1.0943 | 1.0958 | 1.0973 | 1.0988 | 1.1002 |
| 87.8 | 31 | 1.0819 | 1.0834 | 1.0849 | 1.0864 | 1.0879 | 1.0893 | 1.0909 | 1.0923 | 1.0938 |
| 89.6 | 32 | 1.0755 | 1.0769 | 1.0784 | 1.0799 | 1.0814 | 1.0829 | 1.0843 | 1.0858 | 1.0873 |
| 91.4 | 33 | 1.0690 | 1.0705 | 1.0719 | 1.0734 | 1.0749 | 1.0764 | 1.0778 | 1.0793 | 1.0808 |
| 93.2 | 34 | 1.0622 | 1.0637 | 1.0652 | 1.0666 | 1.0681 | 1.0696 | 1.0710 | 1.0725 | 1.0740 |
| 95 | 35 | 1.0555 | 1.0570 | 1.0585 | 1.0599 | 1.0614 | 1.0629 | 1.0643 | 1.0658 | 1.0673 |

## AMMONIA CONVERSION-TABLE, WHEN THE PER CENT OF NITROGEN IS KNOWN.

Nitrogen .00–2.51.

| N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| .00 | .00 | .42 | .51 | .84 | 1.02 | 1.26 | 1.53 | 1.68 | 2.04 | 2.10 | 2.55 |
| .01 | .01 | .43 | .52 | .85 | 1.03 | 1.27 | 1.54 | 1.69 | 2.05 | 2.11 | 2.56 |
| .02 | .02 | .44 | .53 | .86 | 1.04 | 1.28 | 1.55 | 1.70 | 2.06 | 2.12 | 2.57 |
| .03 | .04 | .45 | .55 | .87 | 1.06 | 1.29 | 1.57 | 1.71 | 2.08 | 2.13 | 2.59 |
| .04 | .05 | .46 | .56 | .88 | 1.07 | 1.30 | 1.58 | 1.72 | 2.09 | 2.14 | 2.60 |
| .05 | .06 | .47 | .57 | .89 | 1.08 | 1.31 | 1.59 | 1.73 | 2.10 | 2.15 | 2.61 |
| .06 | .07 | .48 | .58 | .90 | 1.09 | 1.32 | 1.60 | 1.74 | 2.11 | 2.16 | 2.62 |
| .07 | .08 | .49 | .59 | .91 | 1.10 | 1.33 | 1.61 | 1.75 | 2.12 | 2.17 | 2.63 |
| .08 | .10 | .50 | .61 | .92 | 1.12 | 1.34 | 1.63 | 1.76 | 2.14 | 2.18 | 2.65 |
| .09 | .11 | .51 | .62 | .93 | 1.13 | 1.35 | 1.64 | 1.77 | 2.15 | 2.19 | 2.66 |
| .10 | .12 | .52 | .63 | .94 | 1.14 | 1.36 | 1.65 | 1.78 | 2.16 | 2.20 | 2.67 |
| .11 | .13 | .53 | .64 | .95 | 1.15 | 1.37 | 1.66 | 1.79 | 2.17 | 2.21 | 2.68 |
| .12 | .15 | .54 | .66 | .96 | 1.17 | 1.38 | 1.68 | 1.80 | 2.19 | 2.22 | 2.70 |
| .13 | .16 | .55 | .67 | .97 | 1.18 | 1.39 | 1.69 | 1.81 | 2.20 | 2.23 | 2.71 |
| .14 | .17 | .56 | .68 | .98 | 1.19 | 1.40 | 1.70 | 1.82 | 2.21 | 2.24 | 2.72 |
| .15 | .18 | .57 | .69 | .99 | 1.20 | 1.41 | 1.71 | 1.83 | 2.22 | 2.25 | 2.73 |
| .16 | .19 | .58 | .70 | 1.00 | 1.21 | 1.42 | 1.72 | 1.84 | 2.23 | 2.26 | 2.74 |
| .17 | .21 | .59 | .72 | 1.01 | 1.23 | 1.43 | 1.74 | 1.85 | 2.25 | 2.27 | 2.76 |
| .18 | .22 | .60 | .73 | 1.02 | 1.24 | 1.44 | 1.75 | 1.86 | 2.26 | 2.28 | 2.77 |
| .19 | .23 | .61 | .74 | 1.03 | 1.25 | 1.45 | 1.76 | 1.87 | 2.27 | 2.29 | 2.78 |
| .20 | .24 | .62 | .75 | 1.04 | 1.26 | 1.46 | 1.77 | 1.88 | 2.28 | 2.30 | 2.79 |
| .21 | .25 | .63 | .76 | 1.05 | 1.27 | 1.47 | 1.78 | 1.89 | 2.29 | 2.31 | 2.80 |
| .22 | .27 | .64 | .78 | 1.06 | 1.29 | 1.48 | 1.80 | 1.90 | 2.31 | 2.32 | 2.82 |
| .23 | .28 | .65 | .79 | 1.07 | 1.30 | 1.49 | 1.81 | 1.91 | 2.32 | 2.33 | 2.83 |
| .24 | .29 | .66 | .80 | 1.08 | 1.31 | 1.50 | 1.82 | 1.92 | 2.33 | 2.34 | 2.84 |
| .25 | .30 | .67 | .81 | 1.09 | 1.32 | 1.51 | 1.83 | 1.93 | 2.34 | 2.35 | 2.85 |
| .26 | .32 | .68 | .83 | 1.10 | 1.34 | 1.52 | 1.85 | 1.94 | 2.36 | 2.36 | 2.87 |
| .27 | .33 | .69 | .84 | 1.11 | 1.35 | 1.53 | 1.86 | 1.95 | 2.37 | 2.37 | 2.88 |
| .28 | .34 | .70 | .85 | 1.12 | 1.36 | 1.54 | 1.87 | 1.96 | 2.38 | 2.38 | 2.89 |
| .29 | .35 | .71 | .86 | 1.13 | 1.37 | 1.55 | 1.88 | 1.97 | 2.39 | 2.39 | 2.90 |
| .30 | .36 | .72 | .87 | 1.14 | 1.38 | 1.56 | 1.89 | 1.98 | 2.40 | 2.40 | 2.91 |
| .31 | .38 | .73 | .89 | 1.15 | 1.40 | 1.57 | 1.91 | 1.99 | 2.42 | 2.41 | 2.93 |
| .32 | .39 | .74 | .90 | 1.16 | 1.41 | 1.58 | 1.92 | 2.00 | 2.43 | 2.42 | 2.94 |
| .33 | .40 | .75 | .91 | 1.17 | 1.42 | 1.59 | 1.93 | 2.01 | 2.44 | 2.43 | 2.95 |
| .34 | .41 | .76 | .92 | 1.18 | 1.43 | 1.60 | 1.94 | 2.02 | 2.45 | 2.44 | 2.96 |
| .35 | .42 | .77 | .93 | 1.19 | 1.44 | 1.61 | 1.95 | 2.03 | 2.46 | 2.45 | 2.97 |
| .36 | .44 | .78 | .95 | 1.20 | 1.46 | 1.62 | 1.97 | 2.04 | 2.48 | 2.46 | 2.99 |
| .37 | .45 | .79 | .96 | 1.21 | 1.47 | 1.63 | 1.98 | 2.05 | 2.49 | 2.47 | 3.00 |
| .38 | .46 | .80 | .97 | 1.22 | 1.48 | 1.64 | 1.99 | 2.06 | 2.50 | 2.48 | 3.01 |
| .39 | .47 | .81 | .98 | 1.23 | 1.49 | 1.65 | 2.00 | 2.07 | 2.51 | 2.49 | 3.02 |
| .40 | .49 | .82 | 1.00 | 1.24 | 1.51 | 1.66 | 2.02 | 2.08 | 2.53 | 2.50 | 3.04 |
| .41 | .50 | .83 | 1.01 | 1.25 | 1.52 | 1.67 | 2.03 | 2.09 | 2.54 | 2.51 | 3.05 |

## AMMONIA CONVERSION-TABLE—*Continued.*

Nitrogen 2.52–5.21.

| N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$ | N. | $NH_3$. | N. | $NH_3$. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.52 | 3.06 | 2.97 | 3.61 | 3.42 | 4.15 | 3.87 | 4.70 | 4.32 | 5.24 | 4.77 | 5.79 |
| 2.53 | 3.07 | 2.98 | 3.62 | 3.43 | 4.16 | 3.88 | 4.71 | 4.33 | 5.26 | 4.78 | 5.80 |
| 2.54 | 3.08 | 2.99 | 3.63 | 3.44 | 4.18 | 3.89 | 4.72 | 4.34 | 5.27 | 4.79 | 5.82 |
| 2.55 | 3.10 | 3 | 3.64 | 3.45 | 4.19 | 3.90 | 4.73 | 4.35 | 5.28 | 4.80 | 5.83 |
| 2.56 | 3.11 | 3.01 | 3.65 | 3.46 | 4.20 | 3.91 | 4.75 | 4.36 | 5.29 | 4.81 | 5.84 |
| 2.57 | 3.12 | 3.02 | 3.67 | 3.47 | 4.21 | 3.92 | 4.76 | 4.37 | 5.31 | 4.82 | 5.85 |
| 2.58 | 3.13 | 3.03 | 3.68 | 3.48 | 4.22 | 3.93 | 4.77 | 4.38 | 5.32 | 4.83 | 5.86 |
| 2.59 | 3.14 | 3.04 | 3.69 | 3.49 | 4.24 | 3.94 | 4.78 | 4.39 | 5.33 | 4.84 | 5.88 |
| 2.60 | 3.16 | 3.05 | 3.70 | 3.50 | 4.25 | 3.95 | 4.80 | 4.40 | 5.34 | 4.85 | 5.89 |
| 2.61 | 3.17 | 3.06 | 3.71 | 3.51 | 4.26 | 3.96 | 4.81 | 4.41 | 5.35 | 4.86 | 5.90 |
| 2.62 | 3.18 | 3.07 | 3.73 | 3.52 | 4.27 | 3.97 | 4.82 | 4.42 | 5.37 | 4.87 | 5.91 |
| 2.63 | 3.19 | 3.08 | 3.74 | 3.53 | 4.29 | 3.98 | 4.83 | 4.43 | 5.38 | 4.88 | 5.92 |
| 2.64 | 3.20 | 3.09 | 3.75 | 3.54 | 4.30 | 3.99 | 4.84 | 4.44 | 5.39 | 4.89 | 5.94 |
| 2.65 | 3.22 | 3.10 | 3.76 | 3.55 | 4.31 | 4 | 4.86 | 4.45 | 5.40 | 4.90 | 5.95 |
| 2.66 | 3.23 | 3.11 | 3.78 | 3.56 | 4.32 | 4.01 | 4.87 | 4.46 | 5.41 | 4.91 | 5.96 |
| 2.67 | 3.24 | 3.12 | 3.79 | 3.57 | 4.33 | 4.02 | 4.88 | 4.47 | 5.43 | 4.92 | 5.97 |
| 2.68 | 3.25 | 3.13 | 3.80 | 3.58 | 4.35 | 4.03 | 4.89 | 4.48 | 5.44 | 4.93 | 5.99 |
| 2.69 | 3.27 | 3.14 | 3.81 | 3.59 | 4.36 | 4.04 | 4.90 | 4.49 | 5.45 | 4.94 | 6 |
| 2.70 | 3.28 | 3.15 | 3.82 | 3.60 | 4.37 | 4.05 | 4.92 | 4.50 | 5.46 | 4.95 | 6.01 |
| 2.71 | 3.29 | 3.16 | 3.84 | 3.61 | 4.38 | 4.06 | 4.93 | 4.51 | 5.48 | 4.96 | 6.02 |
| 2.72 | 3.30 | 3.17 | 3.85 | 3.62 | 4.39 | 4.07 | 4.94 | 4.52 | 5.49 | 4.97 | 6.03 |
| 2.73 | 3.31 | 3.18 | 3.86 | 3.63 | 4.41 | 4.08 | 4.95 | 4.53 | 5.50 | 4.98 | 6.05 |
| 2.74 | 3.33 | 3.19 | 3.87 | 3.64 | 4.42 | 4.09 | 4.97 | 4.54 | 5.51 | 4.99 | 6.06 |
| 2.75 | 3.34 | 3.20 | 3.88 | 3.65 | 4.43 | 4.10 | 4.98 | 4.55 | 5.52 | 5 | 6.07 |
| 2.76 | 3.35 | 3.21 | 3.90 | 3.66 | 4.44 | 4.11 | 4.99 | 4.56 | 5.54 | 5.01 | 6.08 |
| 2.77 | 3.36 | 3.22 | 3.91 | 3.67 | 4.46 | 4.12 | 5 | 4.57 | 5.55 | 5.02 | 6.09 |
| 2.78 | 3.37 | 3.23 | 3.92 | 3.68 | 4.47 | 4.13 | 5.01 | 4.58 | 5.56 | 5.03 | 6.11 |
| 2.79 | 3.39 | 3.24 | 3.93 | 3.69 | 4.48 | 4.14 | 5.03 | 4.59 | 5.57 | 5.04 | 6.12 |
| 2.80 | 3.40 | 3.25 | 3.95 | 3.70 | 4.49 | 4.15 | 5.04 | 4.60 | 5.58 | 5.05 | 6.13 |
| 2.81 | 3.41 | 3.26 | 3.96 | 3.71 | 4.50 | 4.16 | 5.05 | 4.61 | 5.60 | 5.06 | 6.14 |
| 2.82 | 3.42 | 3.27 | 3.97 | 3.72 | 4.52 | 4.17 | 5.06 | 4.62 | 5.61 | 5.07 | 6.15 |
| 2.83 | 3.44 | 3.28 | 3.98 | 3.73 | 4.53 | 4.18 | 5.07 | 4.63 | 5.62 | 5.08 | 6.17 |
| 2.84 | 3.45 | 3.29 | 3.99 | 3.74 | 4.54 | 4.19 | 5.09 | 4.64 | 5.63 | 5.09 | 6.18 |
| 2.85 | 3.46 | 3.30 | 4.01 | 3.75 | 4.55 | 4.20 | 5.10 | 4.65 | 5.65 | 5.10 | 6.19 |
| 2.86 | 3.47 | 3.31 | 4.02 | 3.76 | 4.56 | 4.21 | 5.11 | 4.66 | 5.66 | 5.11 | 6.20 |
| 2.87 | 3.48 | 3.32 | 4.03 | 3.77 | 4.58 | 4.22 | 5.12 | 4.67 | 5.67 | 5.12 | 6.22 |
| 2.88 | 3.50 | 3.33 | 4.04 | 3.78 | 4.59 | 4.23 | 5.14 | 4.68 | 5.68 | 5.13 | 6.23 |
| 2.89 | 3.51 | 3.34 | 4.05 | 3.79 | 4.60 | 4.24 | 5.15 | 4.69 | 5.69 | 5.14 | 6.24 |
| 2.90 | 3.52 | 3.35 | 4.07 | 3.80 | 4.61 | 4.25 | 5.16 | 4.70 | 5.71 | 5.15 | 6.25 |
| 2.91 | 3.53 | 3.36 | 4.08 | 3.81 | 4.63 | 4.26 | 5.17 | 4.71 | 5.72 | 5.16 | 6.26 |
| 2.92 | 3.54 | 3.37 | 4.09 | 3.82 | 4.64 | 4.27 | 5.18 | 4.72 | 5.73 | 5.17 | 6.28 |
| 2.93 | 3.56 | 3.38 | 4.10 | 3.83 | 4.65 | 4.28 | 5.20 | 4.73 | 5.74 | 5.18 | 6.29 |
| 2.94 | 3.57 | 3.39 | 4.12 | 3.84 | 4.66 | 4.29 | 5.21 | 4.74 | 5.75 | 5.19 | 6.30 |
| 2.95 | 3.58 | 3.40 | 4.13 | 3.85 | 4.67 | 4.30 | 5.22 | 4.75 | 5.77 | 5.20 | 6.31 |
| 2.96 | 3.59 | 3.41 | 4.14 | 3.86 | 4.69 | 4.31 | 5.23 | 4.76 | 5.78 | 5.21 | 6.32 |

## AMMONIA CONVERSION-TABLE—*Continued.*

Nitrogen 5.22–7.91.

| N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.22 | 6.34 | 5.67 | 6.88 | 6.12 | 7.43 | 6.57 | 7.98 | 7.02 | 8.52 | 7.47 | 9.07 |
| 5.23 | 6.35 | 5.68 | 6.90 | 6.13 | 7.44 | 6.58 | 7.99 | 7.03 | 8.53 | 7.48 | 9.08 |
| 5.24 | 6.36 | 5.69 | 6.91 | 6.14 | 7.45 | 6.59 | 8 | 7.04 | 8.55 | 7.49 | 9.09 |
| 5.25 | 6.37 | 5.70 | 6.92 | 6.15 | 7.47 | 6.60 | 8.01 | 7.05 | 8.56 | 7.50 | 9.11 |
| 5.26 | 6.39 | 5.71 | 6.93 | 6.16 | 7.48 | 6.61 | 8.02 | 7.06 | 8.57 | 7.51 | 9.12 |
| 5.27 | 6.40 | 5.72 | 6.94 | 6.17 | 7.49 | 6.62 | 8.04 | 7.07 | 8.58 | 7.52 | 9.13 |
| 5.28 | 6.41 | 5.73 | 6.96 | 6.18 | 7.50 | 6.63 | 8.05 | 7.08 | 8.60 | 7.53 | 9.14 |
| 5.29 | 6.42 | 5.74 | 6.97 | 0.19 | 7.51 | 6.64 | 8.06 | 7.09 | 8.61 | 7.54 | 9.15 |
| 5.30 | 6.43 | 5.75 | 6.98 | 6.20 | 7.53 | 6.65 | 8.07 | 7.10 | 8.62 | 7.55 | 9.17 |
| 5.31 | 6.45 | 5.76 | 6.99 | 6.21 | 7.54 | 6.66 | 8.09 | 7.11 | 8.63 | 7.56 | 9.18 |
| 5.32 | 6.46 | 5.77 | 7 | 6.22 | 7.55 | 6.67 | 8.10 | 7.12 | 8.64 | 7.57 | 9.19 |
| 5.33 | 6.47 | 5.78 | 7.02 | 6.23 | 7.56 | 6.68 | 8.11 | 7.13 | 8.66 | 7.58 | 9.20 |
| 5.34 | 6.48 | 5.79 | 7.03 | 6.24 | 7.58 | 6.69 | 8.12 | 7.14 | 8.67 | 7.59 | 9.21 |
| 5.35 | 6.49 | 5.80 | 7.04 | 6.25 | 7.59 | 6.70 | 8.13 | 7.15 | 8.68 | 7.60 | 9.23 |
| 5.36 | 6.51 | 5.81 | 7.05 | 6.26 | 7.60 | 6.71 | 8.15 | 7.16 | 8.69 | 7.61 | 9.24 |
| 5.37 | 6.52 | 5.82 | 7.07 | 6.27 | 7.61 | 6.72 | 8.16 | 7.17 | 8.70 | 7.62 | 9.25 |
| 5.38 | 6.53 | 5.83 | 7.08 | 6.28 | 7.62 | 6.73 | 8.17 | 7.18 | 8.72 | 7.63 | 9.26 |
| 5.39 | 6.54 | 5.84 | 7.09 | 6.29 | 7.64 | 6.74 | 8.18 | 7.19 | 8.73 | 7.64 | 9.27 |
| 5.40 | 6.56 | 5.85 | 7.10 | 6.30 | 7.65 | 6.75 | 8.19 | 7.20 | 8.74 | 7.65 | 9.29 |
| 5.41 | 6.57 | 5.86 | 7.11 | 6.31 | 7.66 | 6.76 | 8.21 | 7.21 | 8.75 | 7.66 | 9.30 |
| 5.42 | 6.58 | 5.87 | 7.13 | 6.32 | 7.67 | 6.77 | 8.22 | 7.22 | 8.77 | 7.67 | 9.31 |
| 5.43 | 6.59 | 5.88 | 7.14 | 6.33 | 7.68 | 6.78 | 8.23 | 7.23 | 8.78 | 7.68 | 9.32 |
| 5.44 | 6.60 | 5.89 | 7.15 | 6.34 | 7.70 | 6.79 | 8.24 | 7.24 | 8.79 | 7.69 | 9.34 |
| 5.45 | 6.62 | 5.90 | 7.16 | 6.35 | 7.71 | 6.80 | 8.26 | 7.25 | 8.80 | 7.70 | 9.35 |
| 5.46 | 6.63 | 5.91 | 7.17 | 6.36 | 7.72 | 6.81 | 8.27 | 7.26 | 8.81 | 7.71 | 9.36 |
| 5.47 | 6.64 | 5.92 | 7.19 | 6.37 | 7.73 | 6.82 | 8.28 | 7.27 | 8.83 | 7.72 | 9.37 |
| 5.48 | 6.65 | 5.93 | 7.20 | 6.38 | 7.75 | 6.83 | 8.29 | 7.28 | 8.84 | 7.73 | 9.38 |
| 5.49 | 6.66 | 5.94 | 7.21 | 6.39 | 7.76 | 6.84 | 8.30 | 7.29 | 8.85 | 7.74 | 9.40 |
| 5.50 | 6.68 | 5.95 | 7.22 | 6.40 | 7.77 | 6.85 | 8.32 | 7.30 | 8.86 | 7.75 | 9.41 |
| 5.51 | 6.69 | 5.96 | 7.24 | 6.41 | 7.78 | 6.86 | 8.33 | 7.31 | 8.87 | 7.76 | 9.42 |
| 5.52 | 9.70 | 5.97 | 7.25 | 6.42 | 7.79 | 6.87 | 8.34 | 7.32 | 8.89 | 7.77 | 9.43 |
| 5.53 | 6.71 | 5'98 | 7.26 | 6.43 | 7.81 | 6.88 | 8.35 | 7.33 | 8.90 | 7.78 | 9.44 |
| 5.54 | 6.73 | 5.99 | 7.27 | 6.44 | 7.82 | 6.89 | 8.36 | 7.34 | 8.91 | 7.79 | 9.46 |
| 5.55 | 6.74 | 6 | 7.28 | 6.45 | 7.83 | 6.90 | 8.38 | 7.35 | 8.92 | 7.80 | 9.47 |
| 5.56 | 6.75 | 6.01 | 7.30 | 6.46 | 7.84 | 6.91 | 8.39 | 7.36 | 8.94 | 7.81 | 9.48 |
| 5.57 | 6.76 | 6.02 | 7.31 | 6.47 | 7.85 | 6.92 | 8.40 | 7.37 | 8.95 | 7.82 | 9.49 |
| 5.58 | 6.77 | 6.03 | 7.32 | 6.48 | 7.87 | 6.93 | 8.41 | 7.38 | 8.96 | 7.83 | 9.51 |
| 5.59 | 6.79 | 6.04 | 7.33 | 6.49 | 7.88 | 6.94 | 8.43 | 7.39 | 8.97 | 7.84 | 9.52 |
| 5.60 | 6.80 | 6.05 | 7.34 | 6.50 | 7.89 | 6.95 | 8.44 | 7.40 | 8.98 | 7.85 | 9.53 |
| 5.61 | 6.81 | 6.06 | 7.36 | 6.51 | 7.90 | 6.96 | 8.45 | 7.41 | 9 | 7.86 | 9 54 |
| 5.62 | 6.82 | 6.07 | 7.37 | 6.52 | 7.92 | 6.97 | 8.46 | 7.42 | 9.01 | 7.87 | 9 55 |
| 5.63 | 6.83 | 6.08 | 7.38 | 6.53 | 7.93 | 6.98 | 8.47 | 7.43 | 9.02 | 7.88 | 9.57 |
| 5.64 | 6.85 | 6.09 | 7.39 | 6.54 | 7.94 | 6.99 | 8.49 | 7.44 | 9.03 | 7.89 | 9.58 |
| 5.65 | 6 86 | 6.10 | 7.41 | 6.55 | 7.95 | 7 | 8.50 | 7.45 | 9.04 | 7.90 | 9.59 |
| 5.66 | 6.87 | 6.11 | 7.42 | 6.56 | 7.96 | 7 01 | 8.51 | 7.46 | 9.06 | 7.91 | 9.60 |

## AMMONIA CONVERSION-TABLE—*Continued.*

Nitrogen 7.92–10.61.

| N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7.92 | 9.61 | 8.37 | 10.16 | 8.82 | 10.71 | 9.27 | 11.25 | 9.72 | 11.80 | 10.17 | 12.35 |
| 7.93 | 9.63 | 8.38 | 10.17 | 8.83 | 10.72 | 9.28 | 11.27 | 9.73 | 11.81 | 10.18 | 12.36 |
| 7.94 | 9.64 | 8.39 | 10.19 | 8.84 | 10.73 | 9.29 | 11.28 | 9.74 | 11.82 | 10.19 | 12.37 |
| 7.95 | 9.65 | 8.40 | 10.20 | 8.85 | 10.74 | 9.30 | 11.29 | 9.75 | 11.84 | 10.20 | 12.38 |
| 7.96 | 9.66 | 8.41 | 10.21 | 8.86 | 10.76 | 9.31 | 11.30 | 9.76 | 11.85 | 10.21 | 12.39 |
| 7.97 | 9.68 | 8.42 | 10.22 | 8.87 | 10.77 | 9.32 | 11.31 | 9.77 | 11.86 | 10.22 | 12.41 |
| 7.98 | 9.69 | 8.43 | 10.23 | 8.88 | 10.78 | 9.33 | 11.33 | 9.78 | 11.87 | 10.23 | 12.42 |
| 7.99 | 9.70 | 8.44 | 10.25 | 8.89 | 10.79 | 9.34 | 11.34 | 9.79 | 11.89 | 10.24 | 12.43 |
| 8 | 9.71 | 8.45 | 10.26 | 8.90 | 10.80 | 9.35 | 11.35 | 9.80 | 11.90 | 10.25 | 12.44 |
| 8.01 | 9.72 | 8.46 | 10.27 | 8.91 | 10.82 | 9.36 | 11.36 | 9.81 | 11.91 | 10.26 | 12.46 |
| 8.02 | 9.74 | 8.47 | 10.28 | 8.92 | 10.83 | 9.37 | 11.38 | 9.82 | 11.92 | 10.27 | 12.47 |
| 8.03 | 9.75 | 8.48 | 10.29 | 8.93 | 10.84 | 9.38 | 11.39 | 9.83 | 11.93 | 10.28 | 12.48 |
| 8.04 | 9.76 | 8.49 | 10.31 | 8.94 | 10.85 | 9.39 | 11.40 | 9.84 | 11.95 | 10.29 | 12.49 |
| 8.05 | 9.77 | 8.50 | 10.32 | 8.95 | 10.87 | 9.40 | 11.41 | 9.85 | 11.96 | 10.30 | 12.50 |
| 8.06 | 9.78 | 8.51 | 10.33 | 8.96 | 10.88 | 9.41 | 11.42 | 9.86 | 11.97 | 10.31 | 12.52 |
| 8.07 | 9.80 | 8.52 | 10.34 | 8.97 | 10.89 | 9.42 | 11.44 | 9.87 | 11.98 | 10.32 | 12.53 |
| 8.08 | 9.81 | 8.53 | 10.36 | 8.98 | 10.90 | 9.43 | 11.45 | 9.88 | 11.99 | 10.33 | 12.54 |
| 8.09 | 9.82 | 8.54 | 10.37 | 8.99 | 10.91 | 9.44 | 11.46 | 9.89 | 12.01 | 10.34 | 12.55 |
| 8.10 | 9.83 | 8.55 | 10.38 | 9 | 10.93 | 9.45 | 11.47 | 9.90 | 12.02 | 10.35 | 12.56 |
| 8.11 | 9.85 | 8.56 | 10.39 | 9.01 | 10.94 | 9.46 | 11.48 | 9.91 | 12.03 | 10.36 | 12.58 |
| 8.12 | 9.86 | 8.57 | 10.40 | 9.02 | 10.95 | 9.47 | 11.50 | 9.92 | 12.04 | 10.37 | 12.59 |
| 8.13 | 9.87 | 8.58 | 10.42 | 9.03 | 10.96 | 9.48 | 11.51 | 9.93 | 12.06 | 10.38 | 12.60 |
| 8.14 | 9.88 | 8.59 | 10.43 | 9.04 | 10.97 | 9.49 | 11.52 | 9.94 | 12.07 | 10.39 | 12.61 |
| 8.15 | 9.89 | 8.60 | 10.44 | 9.05 | 10.99 | 9.50 | 11.53 | 9.95 | 12.08 | 10.40 | 12.63 |
| 8.16 | 9.91 | 8.61 | 10.45 | 9.06 | 11 | 9.51 | 11.55 | 9.96 | 12.09 | 10.41 | 12.64 |
| 8.17 | 9.92 | 8.62 | 10.46 | 9.07 | 11.01 | 9.52 | 11.56 | 9.97 | 12.10 | 10.42 | 12.65 |
| 8.18 | 9.93 | 8.63 | 10.48 | 9.08 | 11.02 | 9.53 | 11.57 | 9.98 | 12.12 | 10.43 | 12.66 |
| 8.19 | 9.94 | 8.64 | 10.49 | 9.09 | 11.04 | 9.54 | 11.58 | 9.99 | 12.13 | 10.44 | 12.67 |
| 8.20 | 9.95 | 8.65 | 10.50 | 9.10 | 11.05 | 9.55 | 11.59 | 10 | 12.14 | 10.45 | 12.69 |
| 8.21 | 9.97 | 8.66 | 10.51 | 9.11 | 11.06 | 9.56 | 11.61 | 10.01 | 12.15 | 10.46 | 12.70 |
| 8.22 | 9.98 | 8.67 | 10.53 | 9.12 | 11.07 | 9.57 | 11.62 | 10.02 | 12.16 | 10.47 | 12.71 |
| 8.23 | 9.99 | 8.68 | 10.54 | 9.13 | 11.08 | 9.58 | 11.63 | 10.03 | 12.18 | 10.48 | 12.72 |
| 8.24 | 10 | 8.69 | 10.55 | 9.14 | 11.10 | 9.59 | 11.64 | 10.04 | 12.19 | 10.49 | 12.73 |
| 8.25 | 10.02 | 8.70 | 10.56 | 9.15 | 11.11 | 9.60 | 11.65 | 10.05 | 12.20 | 10.50 | 12.75 |
| 8.26 | 10.03 | 8.71 | 10.57 | 9.16 | 11.12 | 9.61 | 11.67 | 10.06 | 12.21 | 10.51 | 12.76 |
| 8.27 | 10.04 | 8.72 | 10.59 | 9.17 | 11.13 | 9.62 | 11.68 | 10.07 | 12.22 | 10.52 | 12.77 |
| 8.28 | 10.05 | 8.73 | 10.60 | 9.18 | 11.14 | 9.63 | 11.69 | 10.08 | 12.24 | 10.53 | 12.78 |
| 8.29 | 10.06 | 8.74 | 10.61 | 9.19 | 11.16 | 9.64 | 11.70 | 10.09 | 12.25 | 10.54 | 12.80 |
| 8.30 | 10.08 | 8.75 | 10.62 | 9.20 | 11.17 | 9.65 | 11.72 | 10.10 | 12.26 | 10.55 | 12.81 |
| 8.31 | 10.09 | 8.76 | 10.63 | 9.21 | 11.18 | 9.66 | 11.73 | 10.11 | 12.27 | 10.56 | 12.82 |
| 8.32 | 10.10 | 8.77 | 10.65 | 9.22 | 11.19 | 9.67 | 11.74 | 10.12 | 12.29 | 10.57 | 12.83 |
| 8.33 | 10.11 | 8.78 | 10.66 | 9.23 | 11.21 | 9.68 | 11.75 | 10.13 | 12.30 | 10.58 | 12.84 |
| 8.34 | 10.12 | 8.79 | 10.67 | 9.24 | 11.22 | 9.69 | 11.76 | 10.14 | 12.31 | 10.59 | 12.86 |
| 8.35 | 10.14 | 8.80 | 10.68 | 9.25 | 11.23 | 9.70 | 11.78 | 10.15 | 12.32 | 10.60 | 12.87 |
| 8.36 | 10.15 | 8.81 | 10.70 | 9.26 | 11.24 | 9.71 | 11.79 | 10.16 | 12.33 | 10.61 | 12.88 |

## AMMONIA CONVERSION-TABLE—*Continued.*

Nitrogen 10.62–13.31.

| N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10.62 | 12.89 | 11.07 | 13.44 | 11.52 | 13.99 | 11.97 | 14.53 | 12.42 | 15.08 | 12.87 | 15.62 |
| 10.63 | 12.90 | 11.08 | 13.45 | 11.53 | 14 | 11.98 | 14.54 | 12.43 | 15.09 | 12.88 | 15.64 |
| 10.64 | 12.92 | 11.09 | 13.46 | 11.54 | 14.01 | 11.99 | 14.56 | 12.44 | 15.10 | 12.89 | 15.65 |
| 10.65 | 12.93 | 11.10 | 13.48 | 11.55 | 14.02 | 12 | 14.57 | 12.45 | 15.11 | 12.90 | 15.66 |
| 10.66 | 12.94 | 11.11 | 13.49 | 11.56 | 14.03 | 12.01 | 14.58 | 12.46 | 15.13 | 12.91 | 15.67 |
| 10.67 | 12.95 | 11.12 | 13.50 | 11.57 | 14.05 | 12.02 | 14.59 | 12.47 | 15.14 | 12.92 | 15.68 |
| 10.68 | 12.97 | 11.13 | 13.51 | 11.58 | 14.06 | 12.03 | 14.60 | 12.48 | 15.15 | 12.93 | 15.70 |
| 10.69 | 12.98 | 11.14 | 13.52 | 11.59 | 14.07 | 12.04 | 14.62 | 12.49 | 15.16 | 12.94 | 15.71 |
| 10.70 | 12.99 | 11.15 | 13.54 | 11.60 | 14.08 | 12.05 | 14.63 | 12.50 | 15.18 | 12.95 | 15.72 |
| 10.71 | 13 | 11.16 | 13.55 | 11.61 | 14.09 | 12.06 | 14.64 | 12.51 | 15.19 | 12.96 | 15.73 |
| 10.72 | 13.01 | 11.17 | 13.56 | 11.62 | 14.11 | 12.07 | 14.65 | 12.52 | 15.20 | 12.97 | 15.75 |
| 10.73 | 13.03 | 11.18 | 13.57 | 11.63 | 14.12 | 12.08 | 14.67 | 12.53 | 15.21 | 12.98 | 15.76 |
| 10.74 | 13.04 | 11.19 | 13.58 | 11.64 | 14.13 | 12.09 | 14.68 | 12.54 | 15.22 | 12.99 | 15.77 |
| 10.75 | 13.05 | 11.20 | 13.60 | 11.65 | 14.14 | 12.10 | 14.69 | 12.55 | 15.24 | 13 | 15.78 |
| 10.76 | 13.06 | 11.21 | 13.61 | 11.66 | 14.16 | 12.11 | 14.70 | 12.56 | 15.25 | 13.01 | 15.79 |
| 10.77 | 13.07 | 11.22 | 13.62 | 11.67 | 14.17 | 12.12 | 14.71 | 12.57 | 15.26 | 13.02 | 15.81 |
| 10.78 | 13.09 | 11.23 | 13.63 | 11.68 | 14.18 | 12.13 | 14.73 | 12.58 | 15.27 | 13.03 | 15.82 |
| 10.79 | 13.10 | 11.24 | 13.65 | 11.69 | 14.19 | 12.14 | 14.74 | 12.59 | 15.28 | 13.04 | 15.83 |
| 10.80 | 13.11 | 11.25 | 13.66 | 11.70 | 14.20 | 12.15 | 14.75 | 12.60 | 15.30 | 13.05 | 15.84 |
| 10.81 | 13.12 | 11.26 | 13.67 | 11.71 | 14.22 | 12.16 | 14.76 | 12.61 | 15.31 | 13.06 | 15.85 |
| 10.82 | 13.14 | 11.27 | 13.68 | 11.72 | 14.23 | 12.17 | 14.77 | 12.62 | 15.32 | 13.07 | 15.87 |
| 10.83 | 13.15 | 11.28 | 13.69 | 11.73 | 14.24 | 12.18 | 14.79 | 12.63 | 15.33 | 13.08 | 15.88 |
| 10.84 | 13.16 | 11.29 | 13.71 | 11.74 | 14.25 | 12.19 | 14.80 | 12.64 | 15.34 | 13.09 | 15.89 |
| 10.85 | 13.17 | 11.30 | 13.72 | 11.75 | 14.26 | 12.20 | 14.81 | 12.65 | 15.36 | 13.10 | 15.90 |
| 10.86 | 13.18 | 11.31 | 13.73 | 11.76 | 14.28 | 12.21 | 14.82 | 12.66 | 15.37 | 13.11 | 15.92 |
| 10.87 | 13.20 | 11.32 | 13.74 | 11.77 | 14.29 | 12.22 | 14.84 | 12.67 | 15.38 | 13.12 | 15.93 |
| 10.88 | 13.21 | 11.33 | 13.75 | 11.78 | 14.30 | 12.23 | 14.85 | 12.68 | 15.39 | 13.13 | 15.94 |
| 10.89 | 13.22 | 11.34 | 13.77 | 11.79 | 14.31 | 12.24 | 14.86 | 12.69 | 15.41 | 13.14 | 15.95 |
| 10.90 | 13.23 | 11.35 | 13.78 | 11.80 | 14.33 | 12.25 | 14.87 | 12.70 | 15.42 | 13.15 | 15.96 |
| 10.91 | 13.24 | 11.36 | 13.79 | 11.81 | 14.34 | 12.26 | 14.88 | 12.71 | 15.43 | 13.16 | 15.98 |
| 10.92 | 13.26 | 11.37 | 13.80 | 11.82 | 14.35 | 12.27 | 14.90 | 12.72 | 15.44 | 13.17 | 15.99 |
| 10.93 | 13.27 | 11.38 | 13.82 | 11.83 | 14.36 | 12.28 | 14.91 | 12.73 | 15.45 | 13.18 | 16 |
| 10.94 | 13.28 | 11.39 | 13.83 | 11.84 | 14.37 | 12.29 | 14.92 | 12.74 | 15.47 | 13.19 | 16.01 |
| 10.95 | 13.29 | 11.40 | 13.84 | 11.85 | 14.39 | 12.30 | 14.93 | 12.75 | 15.48 | 13.20 | 16.02 |
| 10.96 | 13.31 | 11.41 | 13.85 | 11.86 | 14.40 | 12.31 | 14.94 | 12.76 | 15.49 | 13.21 | 16.04 |
| 10.97 | 13.32 | 11.42 | 13.86 | 11.87 | 14.41 | 12.32 | 14.96 | 12.77 | 15.50 | 13.22 | 16.05 |
| 10.98 | 13.33 | 11.43 | 13.88 | 11.88 | 14.42 | 12.33 | 14.97 | 12.78 | 15.51 | 13.23 | 16.06 |
| 10.99 | 13.34 | 11.44 | 13.89 | 11.89 | 14.43 | 12.34 | 14.98 | 12.79 | 15.53 | 13.24 | 16.07 |
| 11 | 13.35 | 11.45 | 13.90 | 11.90 | 14.45 | 12.35 | 14.99 | 12.80 | 15.54 | 13.25 | 16.09 |
| 11.01 | 13.37 | 11.46 | 13.91 | 11.91 | 14.46 | 12.36 | 15.01 | 12.81 | 15.55 | 13.26 | 16.10 |
| 11.02 | 13.38 | 11.47 | 13.92 | 11.92 | 14.47 | 12.37 | 15.02 | 12.82 | 15.56 | 13.27 | 16.11 |
| 11.03 | 13.39 | 11.48 | 13.94 | 11.93 | 14.48 | 12.38 | 15.03 | 12.83 | 15.58 | 13.28 | 16.12 |
| 11.04 | 13.40 | 11.49 | 13.95 | 11.94 | 14.50 | 12.39 | 15.04 | 12.84 | 15.59 | 13.29 | 16.13 |
| 11.05 | 13.41 | 11.50 | 13.96 | 11.95 | 14.51 | 12.40 | 15.05 | 12.85 | 15.60 | 13.30 | 16.15 |
| 11.06 | 13.43 | 11.51 | 13.97 | 11.96 | 14.52 | 12.41 | 15.07 | 12.86 | 15.61 | 13.31 | 16.16 |

## AMMONIA CONVERSION-TABLE—*Continued.*

Nitrogen 13.32–13.99.

| N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. | N. | $NH_3$. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13.32 | 16.17 | 13.60 | 16.51 | 13.88 | 16.85 | 14.16 | 17.19 | 14.44 | 17.53 | 14.72 | 17.87 |
| 13.33 | 16.18 | 13.61 | 16.52 | 13.89 | 16.86 | 14.17 | 17.20 | 14.45 | 17.54 | 14.73 | 17.88 |
| 13.34 | 16.19 | 13.62 | 16.53 | 13.90 | 16.87 | 14.18 | 17.21 | 14.46 | 17.55 | 14.74 | 17.89 |
| 13.35 | 16.21 | 13.63 | 16.55 | 13.91 | 16.89 | 14.19 | 17.23 | 14.47 | 17.57 | 14.75 | 17.91 |
| 13.36 | 16.22 | 13.64 | 16.56 | 13.92 | 16.90 | 14.20 | 17.24 | 14.48 | 17.58 | 14.76 | 17.92 |
| 13.37 | 16.23 | 13.65 | 16.57 | 13.93 | 16.91 | 14.21 | 17.25 | 14.49 | 17.59 | 14.77 | 17.93 |
| 13.38 | 16.24 | 13.66 | 16.58 | 13.94 | 16.92 | 14.22 | 17.26 | 14.50 | 17.60 | 14.78 | 17.94 |
| 13.39 | 16.26 | 13.67 | 16.60 | 13.95 | 16.94 | 14.23 | 17.28 | 14.51 | 17.62 | 14.79 | 17.96 |
| 13.40 | 16.27 | 13.68 | 16.61 | 13.96 | 16.95 | 14.24 | 17.29 | 14.52 | 17.63 | 14.80 | 17.97 |
| 13.41 | 16.28 | 13.69 | 16.62 | 13.97 | 16.96 | 14.25 | 17.30 | 14.53 | 17.64 | 14.81 | 17.98 |
| 13.42 | 16.29 | 13.70 | 16.63 | 13.98 | 16.97 | 14.26 | 17.31 | 14.54 | 17.65 | 14.82 | 17.99 |
| 13.43 | 16.30 | 13.71 | 16.64 | 13.99 | 16.98 | 14.27 | 17.32 | 14.55 | 17.66 | 14.83 | 18 |
| 13.44 | 16.32 | 13.72 | 16.66 | 14 | 17 | 14.28 | 17.34 | 14.56 | 17.68 | 14.84 | 18.02 |
| 13.45 | 16.33 | 13.73 | 16.67 | 14.01 | 17.01 | 14.29 | 17.35 | 14.57 | 17.69 | 14.85 | 18.03 |
| 13.46 | 16.34 | 13.74 | 16.68 | 14.02 | 17.02 | 14.30 | 17.36 | 14.58 | 17.70 | 14.86 | 18.04 |
| 13.47 | 16.35 | 13.75 | 16.69 | 14.03 | 17.03 | 14.31 | 17.37 | 14.59 | 17.71 | 14.87 | 18.05 |
| 13.48 | 16.36 | 13.76 | 16.70 | 14.04 | 17.04 | 14.32 | 17.38 | 14.60 | 17.72 | 14.88 | 18.06 |
| 13.49 | 16.38 | 13.77 | 16.72 | 14.05 | 17.06 | 14.33 | 17.40 | 14.61 | 17.74 | 14.89 | 18.08 |
| 13.50 | 16.39 | 13.78 | 16.73 | 14.06 | 17.07 | 14.34 | 17.41 | 14.62 | 17.75 | 14.90 | 18.09 |
| 13.51 | 16.40 | 13.79 | 16.74 | 14.07 | 17.08 | 14.35 | 17.42 | 14.63 | 17.76 | 14.91 | 18.10 |
| 13.52 | 16.41 | 13.80 | 16.75 | 14.08 | 17.09 | 14.36 | 17.43 | 14.64 | 17.77 | 14.92 | 18.11 |
| 13.53 | 16.43 | 13.81 | 16.77 | 14.09 | 17.11 | 14.37 | 17.45 | 14.65 | 17.79 | 14.93 | 18.13 |
| 13.54 | 16.44 | 13.82 | 16.78 | 14.10 | 17.12 | 14.38 | 17.46 | 14.66 | 17.80 | 14.94 | 18.14 |
| 13.55 | 16.45 | 13.83 | 16.79 | 14.11 | 17.13 | 14.39 | 17.47 | 14.67 | 17.81 | 14.95 | 18.15 |
| 13.56 | 16.46 | 13.84 | 16.80 | 14.12 | 17.14 | 14.40 | 17.48 | 14.68 | 17.82 | 14.96 | 18.16 |
| 13.57 | 16.47 | 13.85 | 16.81 | 14.13 | 17.15 | 14.41 | 17.49 | 14.69 | 17.83 | 14.97 | 18.17 |
| 13.58 | 16.49 | 13.86 | 16.83 | 14.14 | 17.17 | 14.42 | 17.51 | 14.70 | 17.85 | 14.98 | 18.19 |
| 13.59 | 16.50 | 13.87 | 16.84 | 14.15 | 17.18 | 14.43 | 17.52 | 14.71 | 17.86 | 14.99 | 18.20 |

## TABLE FOR THE TENSION OF AQUEOUS VAPOR FOR TEMPERATURES FROM —2° TO 110° CENT. (BUNSEN).

| Degrees Cent. | Tension in Millimetres. | Degrees Cent. | Tension in Millimetres. | Degrees Cent. | Tension in Millimetres. | Degrees Cent. | Tension in Millimetres. | Degrees Cent. | Tension in Millimetres. |
|---|---|---|---|---|---|---|---|---|---|
| —2.0 | 3.955 | 6 | 6.998 | 14 | 11.908 | 22 | 19.659 | 30 | 31.548 |
| —1.8 | 4.016 | 6.2 | 7.095 | 14.2 | 12.064 | 22.2 | 19.901 | 40 | 54.906 |
| —1.6 | 4.078 | 6.4 | 7.193 | 14.4 | 12.220 | 22.4 | 20.143 | 45 | 71.391 |
| —1.4 | 4.140 | 6.6 | 7.292 | 14.6 | 12.378 | 22.6 | 20.389 | 50 | 91.982 |
| —1.2 | 4.203 | 6.8 | 7.392 | 14.8 | 12.538 | 22.8 | 20.639 | 55 | 117.478 |
| —1 | 4.267 | 7 | 7.492 | 15 | 12.699 | 23 | 20.888 | 60 | 148.791 |
| —0.8 | 4.331 | 7.2 | 7.595 | 15.2 | 12.864 | 23.2 | 21.144 | 65 | 186.945 |
| —0.6 | 4.397 | 7.4 | 7.699 | 15.4 | 13.029 | 23.4 | 21.400 | 70 | 233.093 |
| —0.4 | 4.463 | 7.6 | 7.840 | 15.6 | 13.197 | 23.6 | 21.659 | 75 | 288.517 |
| —0.2 | 4.531 | 7.8 | 7.910 | 15.8 | 13.366 | 23.8 | 21.921 | 80 | 354.643 |
| 0 | 4.600 | 8 | 8.017 | 16 | 13.536 | 24 | 22.184 | 85 | 433.041 |
| +0.2 | 4.667 | 8.2 | 8.126 | 16.2 | 13.710 | 24.2 | 22.453 | 90 | 525.450 |
| 0.4 | 4.733 | 8.4 | 8.236 | 16.4 | 13.885 | 24.4 | 22.723 | 95 | 633.778 |
| 0.6 | 4.801 | 8.6 | 8.347 | 16.6 | 14.062 | 24.6 | 22.996 | 99 | 733.21 |
| 0.8 | 4.871 | 8.8 | 8.461 | 16.8 | 14.241 | 24.8 | 23.273 | 99.1 | 735.85 |
| 1 | 4.940 | 9 | 8.574 | 17 | 14.421 | 25 | 23.550 | 99.2 | 738.5 |
| 1.2 | 5.011 | 9.2 | 8.690 | 17.2 | 14.605 | 25.2 | 23.834 | 99.3 | 741.16 |
| 1.4 | 5.082 | 9.4 | 8.807 | 17.4 | 14.790 | 25.4 | 24.119 | 99.4 | 743.83 |
| 1.6 | 5.155 | 9.6 | 8.925 | 17.6 | 14.977 | 25.6 | 24.406 | 99.5 | 746.5 |
| 1.8 | 5.228 | 9.8 | 9.045 | 17.8 | 15.167 | 25.8 | 24.697 | 99.6 | 749.18 |
| 2 | 5.302 | 10 | 9.165 | 18 | 15.357 | 26 | 24.988 | 99.7 | 751.87 |
| 2.2 | 5.378 | 10.2 | 9.288 | 18.2 | 15.552 | 26.2 | 25.288 | 99.8 | 754.57 |
| 2.4 | 5.454 | 10.4 | 9.412 | 18.4 | 15.747 | 26.4 | 25.588 | 99.9 | 757.28 |
| 2.6 | 5.530 | 10.6 | 9.537 | 18.6 | 15.945 | 26.6 | 25.891 | 100 | 760 |
| 2.8 | 5.608 | 10.8 | 9.665 | 18.8 | 16.145 | 26.8 | 26.198 | 100.1 | 762.73 |
| 3 | 5.687 | 11 | 9.792 | 19 | 16.346 | 27 | 26.505 | 100.2 | 765.46 |
| 3.2 | 5.767 | 11.2 | 9.923 | 19.2 | 16.552 | 27.2 | 26.820 | 100.3 | 768.20 |
| 3.4 | 5.848 | 11.4 | 10.054 | 19.4 | 16.758 | 27.4 | 27.136 | 100.4 | 771.95 |
| 3.6 | 5.930 | 11.6 | 10.187 | 19.6 | 16.967 | 27.6 | 27.455 | 100.5 | 773.71 |
| 3.8 | 6.014 | 11.8 | 10.322 | 19.8 | 17.179 | 27.8 | 27.778 | 100.6 | 776.48 |
| 4 | 6.097 | 12 | 10.457 | 20 | 17.391 | 28 | 28.101 | 100.7 | 779.26 |
| 4.2 | 6.183 | 12.2 | 10.596 | 20.2 | 17.608 | 28.2 | 28.433 | 100.8 | 782.04 |
| 4.4 | 6.270 | 12.4 | 10.734 | 20.4 | 17.826 | 28.4 | 28.765 | 100.9 | 784.83 |
| 4.6 | 6.350 | 12.6 | 10.875 | 20.6 | 18.047 | 28.6 | 29.101 | 101 | 787.63 |
| 4.8 | 6.445 | 12.8 | 11.019 | 20.8 | 18.271 | 28.8 | 29.441 | 105 | 960.41 |
| 5 | 6.534 | 13 | 11.162 | 21 | 18.495 | 29 | 29.782 | 110 | 1075.37 |
| 5.2 | 6.625 | 13.2 | 11.309 | 21.2 | 18.724 | 29.2 | 30.131 | | |
| 5.4 | 6.717 | 13.4 | 11.456 | 21.4 | 18.954 | 29.4 | 30.479 | | |
| 5.6 | 6.810 | 13.6 | 11.605 | 21.6 | 19.187 | 29.6 | 30.833 | | |
| 5.8 | 6.904 | 13.8 | 11.757 | 21.8 | 19.423 | 29.8 | 31.190 | | |

## THE MOLECULAR WEIGHTS AND WEIGHTS OF ONE LITRE OF DIFFERENT GASES.

| Substances. | Symbols. | Mol. Weights. | Weight of 1 litre at 760 mm. and 0° Cent. |
|---|---|---|---|
| Ammonia | $NH_3$ | 17 | 0.761 |
| Chlorine | $Cl$ | 71 | 3.18 |
| Carbon monoxide | $CO$ | 28 | 1.254 |
| Carbon dioxide | $CO_2$ | 44 | 1.9774 |
| Methan | $CH_4$ | 16 | .716 |
| Cyanogen | $C_2N_2$ | 52 | 2.330 |
| Hydrogen | $H_2$ | 2 | .08958 |
| Hydrobromic acid | $HBr$ | 81 | 3.63 |
| Hydrofluoric acid | $HF$ | 20 | 0.896 |
| Hydric sulphide | $H_2S$ | 34 | 1.523 |
| Hydrochloric acid | $HCl$ | 36.5 | 1.635 |
| Hydriodic acid | $HI$ | 128 | 5.73 |
| Water | $H_2O$ | 18 | 0.806 |
| Iodine | $I_2$ | 254 | 11.3 |
| Nitrogen | $N_2$ | 28 | 1.256 |
| Nitrous oxide | $N_2O$ | 44 | 1.977 |
| Nitric oxide | $NO$ | 30 | 1.343 |
| Nitric dioxide | $NO_2$ | 46 | 2.06 |
| Oxygen | $O_2$ | 32 | 1.43 |
| Sulphur dioxide | $SO_2$ | 64 | 2.87 |
| Fluoride of silicon | $SiFl_4$ | 104 | 4.66 |
| Atmospheric air | ........... | ............. | 1.29366 |

## TABLE OF PERCENTAGE COMPOSITION.

| | | | | | | |
|---|---|---|---|---|---|---|
| $AlK(SO_4)_2 + 12H_2O$. .... | Al<br>5.707 | K<br>8.245 | $(SO_4)_2$<br>40.501 | $12H_2O$<br>45.547 | | |
| $KSbC_4H_4O_7 + \frac{1}{2}H_2O$. .... | K<br>11.767 | Sb<br>36.174 | $C_4$<br>14.444 | $H_4$<br>1.206 | $O_7$<br>33.699 | $\frac{1}{2}H_2O$<br>2.709 |
| $As_3O_2$.................. | $As_2$<br>75.779 | $O_3$<br>24.220 | | | | |
| $BaCl_2 + 2H_2O$........... | Ba<br>56.182 | $Cl_2$<br>29.060 | $2H_2O$<br>14.758 | | | |
| $Bi(NO_3)_3 + 5H_2O$........ | Bi<br>42.959 | $(NO_3)_3$<br>38.448 | $5H_2O$<br>18.592 | | | |
| CdS...... ............... | Cd<br>77.760 | S<br>22.239 | | | | |
| $CaCO_3$.................. | Ca<br>40.049 | $CO_2$<br>59.950 | | | | |
| $K_2Cr_2O_7$................ | $K_2$<br>26.562 | $Cr_2$<br>35.404 | $O_7$<br>38.034 | | | |
| $K_2Co(SO_4)_2 + 6H_2O$..... | $K_2$<br>17.883 | Co<br>13.494 | $(SO_4)_2$<br>43.924 | $6H_2O$<br>24.698 | | |
| $CuSO_4 + 5H_2O$.......... | Cu<br>25.388 | $SO_4$<br>38.516 | $5H_2O$<br>36.096 | | | |
| $Fe(NH_4)_2(SO_4)_2 + 6H_2O$.. | Fe<br>14.285 | $(NH_4)_2$<br>9.208 | $(SO_4)_2$<br>48.970 | $6H_2O$<br>27.537 | | |
| $Pb(NO_3)_2$................ | Pb<br>62.511 | $(NO_3)_2$<br>37.488 | | | | |
| $MgSO_4 + 7H_2O$ ......... | Mg<br>9.757 | $SO_4$<br>39.031 | $7H_2O$<br>51.211 | | | |
| $Mn(NH_4)_2(SO_4)_2 + 6H_2O$. | Mn<br>13.843 | $(NH_4)_2$<br>9 255 | $(SO_4)_2$<br>49.223 | $6H_2O$<br>27.678 | | |
| $HgCl_2$.................. | Hg<br>73.844 | $Cl_2$<br>26.156 | | | | |
| $(NH_4)_2Ni(SO_4)_2 + 6H_2O$.. | $(NH_4)_2$<br>9.161 | Ni<br>14.724 | $(SO_4)_2$<br>48.719 | $6H_2O$<br>27.397 | | |
| $NH_4NaHPO_4 + 4H_2O$... | $NH_4$<br>8.633 | Na<br>11.025 | H<br>.479 | P<br>14.834 | $4H_2O$<br>34.430 | $O_4$<br>30.598 |
| KCl....... ........... | K<br>52.452 | Cl<br>47.547 | | | | |
| $AgNO_3$.................. | Ag<br>63.492 | $NO_3$<br>36.507 | | | | |
| NaCl.................. | Na<br>39.402 | Cl<br>60.598 | | | | |
| $Sr(NO_3)_2$................ | Sr<br>41.371 | $(NO_3)_2$<br>58.628 | | | | |
| $SnO_2$.......... ....... | Sn<br>78.662 | $O_2$<br>21.337 | | | | |
| $K_2Zn(SO_4)_2 + 6H_2O$..... | $K_2$<br>17.639 | Zn<br>14.671 | $(SO_4)_2$<br>43.326 | $6H_2O$<br>24.363 | | |

## BEAUMÉ'S HYDROMETER.

### A. FOR LIQUIDS HEAVIER THAN WATER.

| B°. | Sp. Grav. | B°. | Sp. Grav. | B°. | Sp. Grav. | B°. | Sp. Grav. |
|---|---|---|---|---|---|---|---|
| 0 | 1.000 | 20 | 1.152 | 39 | 1.345 | 58 | 1.617 |
| 1 | 1.007 | 21 | 1.160 | 40 | 1.357 | 59 | 1.634 |
| 2 | 1.013 | 22 | 1.169 | 41 | 1.369 | 60 | 1.652 |
| 3 | 1.020 | 23 | 1.178 | 42 | 1.382 | 61 | 1.670 |
| 4 | 1.027 | 24 | 1.188 | 43 | 1.397 | 62 | 1.689 |
| 5 | 1.034 | 25 | 1.197 | 44 | 1.407 | 63 | 1.708 |
| 6 | 1.041 | 26 | 1.206 | 45 | 1.421 | 64 | 1.727 |
| 7 | 1.048 | 27 | 1.216 | 46 | 1.434 | 65 | 1.747 |
| 8 | 1.056 | 28 | 1.226 | 47 | 1.448 | 66 | 1.767 |
| 9 | 1.063 | 29 | 1.236 | 48 | 1.462 | 67 | 1.788 |
| 10 | 1.070 | 30 | 1.246 | 49 | 1.476 | 68 | 1.809 |
| 11 | 1.078 | 31 | 1.256 | 50 | 1.490 | 69 | 1.831 |
| 12 | 1.086 | 32 | 1.267 | 51 | 1.505 | 70 | 1.854 |
| 13 | 1.094 | 33 | 1.277 | 52 | 1.520 | 71 | 1.877 |
| 14 | 1.101 | 34 | 1.288 | 53 | 1.535 | 72 | 1.900 |
| 15 | 1.109 | 35 | 1.299 | 54 | 1.551 | 73 | 1.924 |
| 16 | 1.118 | 36 | 1.310 | 55 | 1.567 | 74 | 1.949 |
| 17 | 1.126 | 37 | 1.322 | 56 | 1.583 | 75 | 1.974 |
| 18 | 1.134 | 38 | 1.333 | 57 | 1.600 | 76 | 2.000 |
| 19 | 1.143 |  |  |  |  |  |  |

### B. FOR LIQUIDS LIGHTER THAN WATER.

| B°. | Sp. Grav. | B°. | Sp.Grav. | B°. | Sp Grav. | B°. | Sp.Grav. | B°. | Sp.Grav. |
|---|---|---|---|---|---|---|---|---|---|
| 10 | 1.000 | 24 | 0.913 | 38 | 0.839 | 52 | 0.777 | 65 | 0.729 |
| 11 | 0.993 | 25 | 0.907 | 39 | 0.834 | 53 | 0.773 | 66 | 0.726 |
| 12 | 0.986 | 26 | 0.901 | 40 | 0.830 | 54 | 0.768 | 67 | 0.722 |
| 13 | 0.980 | 27 | 0.896 | 41 | 0.825 | 55 | 0.764 | 68 | 0.718 |
| 14 | 0.973 | 28 | 0.890 | 42 | 0.820 | 56 | 0.760 | 69 | 0.715 |
| 15 | 0.967 | 29 | 0.885 | 43 | 0.816 | 57 | 0.757 | 70 | 0.711 |
| 16 | 0.960 | 30 | 0.880 | 44 | 0.811 | 58 | 0.753 | 71 | 0.708 |
| 17 | 0.954 | 31 | 8.874 | 45 | 0.807 | 59 | 0.749 | 72 | 0.704 |
| 18 | 0.948 | 32 | 0.869 | 46 | 0.802 | 60 | 0.745 | 73 | 0.701 |
| 19 | 0.942 | 33 | 0.864 | 47 | 0.798 | 61 | 0.744 | 74 | 0.698 |
| 20 | 0.936 | 34 | 0.859 | 48 | 0.794 | 62 | 0.740 | 75 | 0.694 |
| 21 | 0.930 | 35 | 0.854 | 49 | 0.789 | 63 | 0.737 | 76 | 0.691 |
| 22 | 0.924 | 36 | 0.849 | 50 | 0.785 | 64 | 0.732 | 77 | 0.688 |
| 23 | 0.918 | 37 | 0.844 | 51 | 0.781 |  |  |  |  |

## ALCOHOL METRICAL TABLE OF TRALLES.

| Alcohol in 100 measures of spirit. | Sp. Gr. 60° F. | Alcohol in 100 measures of spirit. | Sp. Gr. 60° F. | Alcohol in 100 measures of spirit. | Sp. Gr. 60° F. | Alcohol in 100 measures of spirit. | Sp. Gr. 60° F. |
|---|---|---|---|---|---|---|---|
| 0 | .9991 | 26 | .9689 | 51 | .9315 | 76 | .8739 |
| 1 | .9976 | 27 | .9679 | 52 | .9295 | 77 | .8712 |
| 2 | .9961 | 28 | .9668 | 53 | .9275 | 78 | .8685 |
| 3 | .9947 | 29 | .9657 | 54 | .9254 | 79 | .8658 |
| 4 | .9933 | 30 | .9646 | 55 | .9234 | 80 | .8631 |
| 5 | .9919 | 31 | .9634 | 56 | .9213 | 81 | .8603 |
| 6 | .9906 | 32 | .9622 | 57 | .9192 | 82 | .8575 |
| 7 | .9893 | 33 | .9609 | 58 | .9170 | 83 | .8547 |
| 8 | .9881 | 34 | .9596 | 59 | .9148 | 84 | .8518 |
| 9 | .9869 | 35 | .9583 | 60 | .9126 | 85 | .8488 |
| 10 | .9859 | 36 | .9570 | 61 | .9104 | 86 | .8458 |
| 11 | .9845 | 37 | .9556 | 62 | .9082 | 87 | .8428 |
| 12 | .9834 | 38 | .9541 | 63 | .9059 | 88 | .8397 |
| 13 | .9823 | 39 | .9526 | 64 | .9036 | 89 | .8365 |
| 14 | .9812 | 40 | .9510 | 65 | .9013 | 90 | .8332 |
| 15 | .9802 | 41 | .9494 | 66 | .8989 | 91 | .8299 |
| 16 | .9791 | 42 | .9478 | 67 | .8965 | 92 | .8265 |
| 17 | .9781 | 43 | .9461 | 68 | .8941 | 93 | .8230 |
| 18 | .9771 | 44 | .9444 | 69 | .8917 | 94 | .8194 |
| 19 | .9761 | 45 | .9427 | 70 | .8892 | 95 | .8157 |
| 20 | .9751 | 46 | .9409 | 71 | .8867 | 96 | .8118 |
| 21 | .9741 | 47 | .9391 | 72 | .8842 | 97 | .8077 |
| 22 | .9731 | 48 | .9373 | 73 | .8817 | 98 | .8034 |
| 23 | .9720 | 49 | .9354 | 74 | .8791 | 99 | .7988 |
| 24 | .9710 | 50 | .9335 | 75 | .8765 | 100 | .7939 |
| 25 | .9700 |  |  |  |  |  |  |

## TABLE SHOWING VALUE OF DEGREES OF BEAUMÉ IN THOSE OF TRALLES' ALCOHOLMETER.

| Baumé. | Tralles. | Baumé. | Tralles. | Baumé. | Tralles. |
|---|---|---|---|---|---|
| 10.12 | .0 | 23 | 58.9 | 36 | 86.8 |
| 11 | 4.3 | 24 | 61.6 | 37 | 88.4 |
| 12 | 9.8 | 25 | 64.2 | 38 | 90 |
| 13 | 16.1 | 26 | 66.6 | 39 | 91.4 |
| 14 | 22.9 | 27 | 69.0 | 40 | 92.9 |
| 15 | 29.2 | 28 | 71.3 | 41 | 94.2 |
| 16 | 34.5 | 29 | 73.5 | 42 | 95.5 |
| 17 | 39.2 | 30 | 75.6 | 43 | 96.7 |
| 18 | 43.1 | 31 | 77.6 | 44 | 97.8 |
| 19 | 46.8 | 32 | 79.6 | 45 | 98.8 |
| 20 | 50.1 | 33 | 81.5 | 46 | 99.7 |
| 21 | 53.2 | 34 | 83.4 | 46.37 | 100 |
| 22 | 56.1 | 35 | 85.1 | | |

## DEGREES TWADDLES' HYDROMETER AND CORRESPONDING SPECIFIC GRAVITY.

| Degrees. | Specific Gravity. | Degrees. | Specific Gravity. | Degrees. | Specific Gravity. |
|---|---|---|---|---|---|
| 1 | 1.005 | 11 | 1.055 | 20 | 1.100 |
| 2 | 1.010 | 12 | 1.060 | 21 | 1.105 |
| 3 | 1.015 | 13 | 1.065 | 22 | 1.110 |
| 4 | 1.020 | 14 | 1.070 | 23 | 1.115 |
| 5 | 1.025 | 15 | 1.075 | 24 | 1.120 |
| 6 | 1.030 | 16 | 1.080 | 25 | 1.125 |
| 7 | 1.035 | 17 | 1.085 | 26 | 1.130 |
| 8 | 1.040 | 18 | 1.090 | 27 | 1.135 |
| 9 | 1.045 | 19 | 1.095 | 28 | 1.140 |
| 10 | 1.050 | | | | |

## TABLE OF THE PROPORTION BY WEIGHT OF ABSOLUTE OR REAL ALCOHOL IN 100 PARTS OF SPIRITS OF DIFFERENT SPECIFIC GRAVITIES. (FOWNES.)

| Sp. Gr. at 60° (15°5C). | Per cent of real Alcohol. | Sp. Gr. at 60° (15°5C). | Per cent of real Alcohol. | Sp. Gr. at 60° (15°5C). | Per cent of real Alcohol. |
|---|---|---|---|---|---|
| 0.9991 | 0.5 | 0.9511 | 34 | 0.8769 | 68 |
| 0.9981 | 1 | 0.9490 | 35 | 0.8745 | 69 |
| 0.9965 | 2 | 0.9470 | 36 | 0.8721 | 70 |
| 0.9947 | 3 | 0.9452 | 37 | 0.8696 | 71 |
| 0.9930 | 4 | 0.9434 | 38 | 0.8672 | 72 |
| 0.9914 | 5 | 0.9416 | 39 | 0.8649 | 73 |
| 0.9898 | 6 | 0.9396 | 40 | 0.8625 | 74 |
| 0.9884 | 7 | 0.9376 | 41 | 0.8603 | 75 |
| 0.9869 | 8 | 0.9356 | 42 | 0.8581 | 76 |
| 0.9855 | 9 | 0.9335 | 43 | 0.8557 | 77 |
| 0.9841 | 10 | 0.9314 | 44 | 0.8533 | 78 |
| 0.9828 | 11 | 0.9292 | 45 | 0.8508 | 79 |
| 0.9815 | 12 | 0.9270 | 46 | 0.8483 | 80 |
| 0.9802 | 13 | 0.9249 | 47 | 0.8459 | 81 |
| 0.9789 | 14 | 0.9228 | 48 | 0.8434 | 82 |
| 0.9778 | 15 | 0.9206 | 49 | 0.8408 | 83 |
| 0.9766 | 16 | 0.9184 | 50 | 0.8382 | 84 |
| 0.9753 | 17 | 0.9160 | 51 | 0.8357 | 85 |
| 0.9741 | 18 | 0.9135 | 52 | 0.8331 | 86 |
| 0.9728 | 19 | 0.9113 | 53 | 0.8305 | 87 |
| 0.9716 | 20 | 0.9090 | 54 | 0.8279 | 88 |
| 0.9704 | 21 | 0.9069 | 55 | 0.8254 | 89 |
| 0.9691 | 22 | 0.9047 | 56 | 0.8228 | 90 |
| 0.9678 | 23 | 0.9025 | 57 | 0.8199 | 91 |
| 0.9665 | 24 | 0.9001 | 58 | 0.8172 | 92 |
| 0.9652 | 25 | 0.8979 | 59 | 0.8145 | 93 |
| 0.9638 | 26 | 0.8956 | 60 | 0.8118 | 94 |
| 0.9623 | 27 | 0.8932 | 61 | 0.8089 | 95 |
| 0.9609 | 28 | 0.8908 | 62 | 0.8061 | 96 |
| 0.9593 | 29 | 0.8886 | 63 | 0.8031 | 97 |
| 0.9578 | 30 | 0.8863 | 64 | 0.8001 | 98 |
| 0.9560 | 31 | 0.8840 | 65 | 0.7969 | 99 |
| 0.9544 | 32 | 0.8816 | 66 | 0.7938 | 100 |
| 0.9528 | 33 | 0.8793 | 67 | | |

## TABLE OF THE PROPORTION BY VOLUME OF ABSOLUTE OR REAL ALCOHOL IN 100 VOLUMES OF SPIRITS OF DIFFERENT SPECIFIC GRAVITIES (GAY-LUSSAC) AT 59° F. (15° C.).

| Specfic Gravity. | Contain vol. of real Alcohol. | Specfic Gravity. | Contain vol. of real Alcohol. | Specific Gravity. | Contain vol. of real Alcohol. |
|---|---|---|---|---|---|
| 1.0000 | 0 | 0.9608 | 34 | 0.8956 | 68 |
| 0.9985 | 1 | 0.9594 | 35 | 0.8932 | 69 |
| 0.9970 | 2 | 0.9581 | 36 | 0.8907 | 70 |
| 0.9956 | 3 | 0.9567 | 37 | 0.8882 | 71 |
| 0.9942 | 4 | 0.9553 | 38 | 0.8857 | 72 |
| 0.9929 | 5 | 0.9538 | 39 | 0.8831 | 73 |
| 0.9916 | 6 | 0.9523 | 40 | 0.8805 | 74 |
| 0.9903 | 7 | 0.9507 | 41 | 0.8779 | 75 |
| 0.9891 | 8 | 0.9491 | 42 | 0.8753 | 76 |
| 0.9878 | 9 | 0.9474 | 43 | 0.8726 | 77 |
| 0.9867 | 10 | 0.9457 | 44 | 0.8699 | 78 |
| 0.9855 | 11 | 0.9440 | 45 | 0.8672 | 79 |
| 0.9844 | 12 | 0.9422 | 46 | 0.8645 | 80 |
| 0.9833 | 13 | 0.9404 | 47 | 0.8617 | 81 |
| 0.9822 | 14 | 0.9386 | 48 | 0.8589 | 82 |
| 0.9812 | 15 | 0.9367 | 49 | 0.8560 | 83 |
| 0.9802 | 16 | 0.9348 | 50 | 0.8531 | 84 |
| 0.9792 | 17 | 0.9329 | 51 | 0.8502 | 85 |
| 0.9782 | 18 | 0.9309 | 52 | 0.8472 | 86 |
| 0.9773 | 19 | 0.9289 | 53 | 0.8442 | 87 |
| 0.9763 | 20 | 0.9269 | 54 | 0.8411 | 88 |
| 0.9753 | 21 | 0.9248 | 55 | 0.8379 | 89 |
| 0.9742 | 22 | 0.9227 | 56 | 0.8346 | 90 |
| 0.9732 | 23 | 0.9206 | 57 | 0.8312 | 91 |
| 0.9721 | 24 | 0.9185 | 58 | 0.8278 | 92 |
| 0.9711 | 25 | 0.9163 | 59 | 0.8242 | 93 |
| 0.9700 | 26 | 0.9141 | 60 | 0.8206 | 94 |
| 0.9690 | 27 | 0.9119 | 61 | 0.8168 | 95 |
| 0.9679 | 28 | 0.9096 | 62 | 0.8128 | 96 |
| 0.9668 | 29 | 0.9073 | 63 | 0.8086 | 97 |
| 0.9657 | 30 | 0.9050 | 64 | 0.8042 | 98 |
| 0.9645 | 31 | 0.9027 | 65 | 0.8006 | 99 |
| 0.9633 | 32 | 0.9004 | 66 | 0.7947 | 100 |
| 0.9621 | 33 | 0.8980 | 67 | | |

## FACTORS FOR DETERMINING THE QUANTITY OF PURE SUGAR BY THE SACCHAROMETER (VENTZKE).

**Table of factors, corresponding to degrees Balling, to be multiplied by the indication of the saccharometer.**

| Deg. Balling. | Factor. | Deg. Balling. | Factor. | Deg. Balling. | Factor. | Deg. Balling. | Factor. |
|---|---|---|---|---|---|---|---|
| 5 | 5.107 | 7.6 | 3.328 | 10.1 | 2.478 | 12.6 | 1.966 |
| 5.1 | 5.013 | 7.7 | 3.284 | 10.2 | 2.453 | 12.7 | 1.950 |
| 5.2 | 4.920 | 7.8 | 3.240 | 10.3 | 2.428 | 12.8 | 1.934 |
| 5.3 | 4.826 | 7.9 | 3.197 | 10.4 | 2.403 | 12.9 | 1.918 |
| 5.4 | 4.733 | 8 | 3.154 | 10.5 | 2.378 | 13 | 1.902 |
| 5.5 | 4.639 | 8.1 | 3.116 | 10.6 | 2.356 | 13.1 | 1.887 |
| 5.6 | 4 559 | 8.2 | 3.078 | 10.7 | 2.334 | 13.2 | 1.873 |
| 5.7 | 4.479 | 8.3 | 3.039 | 10.8 | 2.311 | 13.3 | 1.858 |
| 5.8 | 4.399 | 8.4 | 3.001 | 10.9 | 2.289 | 13.4 | 1.844 |
| 5.9 | 4.319 | 8.5 | 2.963 | 11 | 2.267 | 13.5 | 1.829 |
| 6 | 4.239 | 8.6 | 2.929 | 11.1 | 2.246 | 13.6 | 1.815 |
| 6.1 | 4.171 | 8.7 | 2.895 | 11.2 | 2.225 | 13.7 | 1.801 |
| 6.2 | 4.103 | 8.8 | 2.860 | 11.3 | 2.204 | 13.8 | 1.787 |
| 6.3 | 4.035 | 8.9 | 2.826 | 11.4 | 2.184 | 13.9 | 1.773 |
| 6.4 | 3.968 | 9 | 2.792 | 11.5 | 2.163 | 14 | 1.759 |
| 6.5 | 3.900 | 9.1 | 2.762 | 11.6 | 2.144 | 14.1 | 1.746 |
| 6.6 | 3.844 | 9.2 | 2.731 | 11.7 | 2.125 | 14.2 | 1.733 |
| 6.7 | 3.787 | 9.3 | 2.700 | 11.8 | 2.107 | 14.3 | 1.721 |
| 6.8 | 3.730 | 9.4 | 2.670 | 11.9 | 2.088 | 14.4 | 1.708 |
| 6.9 | 3.674 | 9.5 | 2.640 | 12 | 2.069 | 14.5 | 1.695 |
| 7 | 3.618 | 9.6 | 2.612 | 12.1 | 2.052 | 14.6 | 1.683 |
| 7.1 | 3.568 | 9.7 | 2.585 | 12.2 | 2.034 | 14.7 | 1.671 |
| 7.2 | 3.519 | 9.8 | 2.558 | 12.3 | 2.016 | 14.8 | 1.659 |
| 7.3 | 3.470 | 9.9 | 2 530 | 12.4 | 2.000 | 14.9 | 1.648 |
| 7.4 | 3.420 | 10 | 2.503 | 12.5 | 1.982 | 15 | 1.636 |
| 7.5 | 3.371 | | | | | | |

## TABLE FOR THE CORRECTION OF TEMPERATURES.

| Difference between the temperatures observed and 17½° Cent. | Quantity to be added or subtracted from degrees Balling. | Difference between the temperatures observed and 17½° Cent. | Quantity to be added or subtracted from degrees Balling. | Difference between the temperatures observed and 17½° Cent. | Quantity to be added or subtracted from degrees Balling. |
|---|---|---|---|---|---|
| 1 | 0.054 | 6 | .327 | 11 | .600 |
| 2 | 0.109 | 7 | .381 | 12 | .654 |
| 3 | .163 | 8 | .436 | 13 | .708 |
| 4 | .218 | 9 | .490 | 14 | .762 |
| 5 | .272 | 10 | .545 | 15 | .817 |

## TABLE OF FACTORS, CORRESPONDING TO DEGREES BALLING, TO BE MULTIPLIED BY THE INDICATION OF THE SACCHAROMETER (DUBOSCQ).

| Deg. Balling. | Factor. | Deg. Balling. | Factor. | Deg. Balling. | Factor. | Deg. Balling. | Factor. |
|---|---|---|---|---|---|---|---|
| 5 | 3.206 | 7.6 | 2.088 | 10.1 | 1.555 | 12.6 | 1.234 |
| 5.1 | 3.151 | 7.7 | 2.061 | 10.2 | 1.540 | 12.7 | 1.224 |
| 5.2 | 3.097 | 7.8 | 2.034 | 10.3 | 1.524 | 12.8 | 1.214 |
| 5.3 | 3.042 | 7.9 | 2.007 | 10.4 | 1.508 | 12.9 | 1.204 |
| 5.4 | 2.988 | 8 | 1.980 | 10.5 | 1.493 | 13 | 1.194 |
| 5.5 | 2.933 | 8.1 | 1.955 | 10.6 | 1.479 | 13.1 | 1.185 |
| 5.6 | 2.879 | 8.2 | 1.931 | 10.7 | 1.465 | 13.2 | 1.176 |
| 5.7 | 2.824 | 8.3 | 1.906 | 10.8 | 1.451 | 13.3 | 1.166 |
| 5.8 | 2.770 | 8.4 | 1.882 | 10.9 | 1.437 | 13.4 | 1.157 |
| 5.9 | 2.715 | 8.5 | 1.860 | 11 | 1.423 | 13.5 | 1.148 |
| 6 | 2.661 | 8.6 | 1.839 | 11.1 | 1.410 | 13.6 | 1.139 |
| 6.1 | 2.622 | 8.7 | 1.817 | 11.2 | 1.397 | 13.7 | 1.130 |
| 6.2 | 2.583 | 8.8 | 1.796 | 11.3 | 1.384 | 13.8 | 1.122 |
| 6.3 | 2.544 | 8.9 | 1.774 | 11.4 | 1.371 | 13.9 | 1.113 |
| 6.4 | 2.505 | 9 | 1.753 | 11.5 | 1.358 | 14 | 1.104 |
| 6.5 | 2.466 | 9.1 | 1.734 | 11.6 | 1.346 | 14.1 | 1.096 |
| 6.6 | 2.427 | 9.2 | 1.714 | 11.7 | 1.334 | 14.2 | 1.088 |
| 6.7 | 2.388 | 9.3 | 1.695 | 11.8 | 1.323 | 14.3 | 1.080 |
| 6.8 | 2 349 | 9.4 | 1.676 | 11.9 | 1.311 | 14.4 | 1.072 |
| 6.9 | 2.310 | 9.5 | 1.657 | 12 | 1.299 | 14.5 | 1.064 |
| 7 | 2.271 | 9.6 | 1.640 | 12.1 | 1.288 | 14.6 | 1.056 |
| 7.1 | 2.240 | 9.7 | 1.622 | 12.2 | 1.277 | 14.7 | 1.049 |
| 7.2 | 2.207 | 9.8 | 1.605 | 12.3 | 1.266 | 14.8 | 1.043 |
| 7.3 | 2.176 | 9.9 | 1.588 | 12.4 | 1.255 | 14.9 | 1.034 |
| 7.4 | 2.147 | 10 | 1.571 | 12.5 | 1.244 | 15 | 1.027 |
| 7.5 | 2.116 | | | | | | |

## PERCENTAGES OF SULPHURIC ACID ($H_2SO_4$) AND $SO_3$ IN AQUEOUS ACID OF VARYING GRAVITY.

(Bineau, Otto. Temp. = 15°.)

| Spec. Gravity. | Per Cent $H_2SO_4$. | Per Cent $SO_3$. | Spec. Gravity. | Per Cent $H_2SO_4$. | Per Cent $SO_3$. | Spec. Gravity. | Per Cent $H_2SO_4$. | Per Cent $SO_3$. |
|---|---|---|---|---|---|---|---|---|
| 1.8426 | 100 | 81.63 | 1.568 | 66 | 53.87 | 1.239 | 32 | 26.12 |
| 1.8420 | 99 | 80.81 | 1.557 | 65 | 53.05 | 1.231 | 31 | 25.30 |
| 1.8406 | 98 | 80 | 1.545 | 64 | 52.24 | 1.223 | 30 | 24.49 |
| 1.8400 | 97 | 79.18 | 1.534 | 63 | 51.42 | 1.215 | 29 | 23.67 |
| 1.8384 | 96 | 78.36 | 1.523 | 62 | 50.61 | 1.2066 | 28 | 22.85 |
| 1.8376 | 95 | 77.55 | 1.512 | 61 | 49.79 | 1.198 | 27 | 22.03 |
| 1.8356 | 94 | 76.73 | 1.501 | 60 | 48.98 | 1.196 | 26 | 21.22 |
| 1.834 | 93 | 75.91 | 1.490 | 59 | 48.16 | 1.182 | 25 | 20.40 |
| 1.831 | 92 | 75.10 | 1.480 | 58 | 47.34 | 1.174 | 24 | 19.58 |
| 1.827 | 91 | 74.28 | 1.469 | 57 | 46.53 | 1.167 | 23 | 18.77 |
| 1.822 | 90 | 73.47 | 1.4586 | 56 | 45.71 | 1.159 | 22 | 17.95 |
| 1.816 | 89 | 72.65 | 1.448 | 55 | 44.89 | 1.1516 | 21 | 17.14 |
| 1.809 | 88 | 71.83 | 1.438 | 54 | 44.07 | 1.144 | 20 | 16.32 |
| 1.802 | 87 | 71.02 | 1.428 | 53 | 43.26 | 1.136 | 19 | 15.51 |
| 1.794 | 86 | 70.10 | 1.418 | 52 | 42.45 | 1.129 | 18 | 14.69 |
| 1.786 | 85 | 69.38 | 1.408 | 51 | 41.63 | 1.121 | 17 | 13.87 |
| 1.777 | 84 | 68.57 | 1.398 | 50 | 40.81 | 1.1136 | 16 | 13.06 |
| 1.767 | 83 | 67.75 | 1.3886 | 49 | 40 | 1.106 | 15 | 12.24 |
| 1.756 | 82 | 66.94 | 1.379 | 48 | 39.18 | 1.098 | 14 | 11.42 |
| 1.745 | 81 | 66.12 | 1.370 | 47 | 38.36 | 1.091 | 13 | 10.61 |
| 1.734 | 80 | 65.30 | 1.361 | 46 | 37.55 | 1.083 | 12 | 9.79 |
| 1.722 | 79 | 64.48 | 1.351 | 45 | 36.73 | 1.0756 | 11 | 8.98 |
| 1.700 | 78 | 63.67 | 1.342 | 44 | 35.82 | 1.068 | 10 | 8.16 |
| 1.698 | 77 | 62.85 | 1.333 | 43 | 35.10 | 1.061 | 9 | 7.34 |
| 1.686 | 76 | 62.04 | 1.324 | 42 | 34.28 | 1.0536 | 8 | 6.53 |
| 1.675 | 75 | 61.22 | 1.315 | 41 | 33.47 | 1.0464 | 7 | 5.71 |
| 1.663 | 74 | 60.40 | 1.306 | 40 | 32.65 | 1.039 | 6 | 4.89 |
| 1.651 | 73 | 59.59 | 1.2976 | 39 | 31.83 | 1.032 | 5 | 4.08 |
| 1.639 | 72 | 58.77 | 1.289 | 38 | 31.02 | 1.0256 | 4 | 3.26 |
| 1.627 | 71 | 57.95 | 1.281 | 37 | 30.20 | 1.019 | 3 | 2.445 |
| 1.615 | 70 | 57.14 | 1.272 | 36 | 29.38 | 1.013 | 2 | 1.63 |
| 1.604 | 69 | 56.32 | 1.264 | 35 | 28.57 | 1.0064 | 1 | 0.816 |
| 1.592 | 68 | 55.59 | 1.256 | 34 | 27.75 | | | |
| 1.580 | 67 | 54.69 | 1.2476 | 33 | 26.94 | | | |

## PERCENTAGES OF SULPHURIC ACID ($H_2SO_4$) AND $SO_3$ IN AQUEOUS ACID OF VARYING GRAVITY.

(Bineau, Otto. Temp. = 15°.)

| Spec. Gravity. | Per Cent $H_2SO_4$. | Per Cent $SO_3$. | Spec. Gravity. | Per Cent $H_2SO_4$. | Per Cent $SO_3$. | Spec. Gravity. | Per Cent $H_2SO_4$. | Per Cent $SO_3$. |
|---|---|---|---|---|---|---|---|---|
| 1.8426 | 100 | 81.63 | 1.568 | 66 | 53.87 | 1.239 | 32 | 26.12 |
| 1.8420 | 99 | 80.81 | 1.557 | 65 | 53.05 | 1.231 | 31 | 25.30 |
| 1.8406 | 98 | 80 | 1.545 | 64 | 52.24 | 1.223 | 30 | 24.49 |
| 1.8400 | 97 | 79.18 | 1.534 | 63 | 51.42 | 1.215 | 29 | 23.67 |
| 1.8384 | 96 | 78.36 | 1.523 | 62 | 50.61 | 1.2066 | 28 | 22.85 |
| 1.8376 | 95 | 77.55 | 1.512 | 61 | 49.79 | 1.198 | 27 | 22.03 |
| 1.8356 | 94 | 76.73 | 1.501 | 60 | 48.98 | 1.196 | 26 | 21.22 |
| 1.834 | 93 | 75.91 | 1.490 | 59 | 48.16 | 1.182 | 25 | 20.40 |
| 1.831 | 92 | 75.10 | 1.480 | 58 | 47.34 | 1.174 | 24 | 19.58 |
| 1.827 | 91 | 74.28 | 1.469 | 57 | 46.53 | 1.167 | 23 | 18.77 |
| 1.822 | 90 | 73.47 | 1.4586 | 56 | 45.71 | 1.159 | 22 | 17.95 |
| 1.816 | 89 | 72.65 | 1.448 | 55 | 44.89 | 1.1516 | 21 | 17.14 |
| 1.809 | 88 | 71.83 | 1.438 | 54 | 44.07 | 1.144 | 20 | 16.32 |
| 1.802 | 87 | 71.02 | 1.428 | 53 | 43.26 | 1.136 | 19 | 15.51 |
| 1.794 | 86 | 70.10 | 1.418 | 52 | 42.45 | 1.129 | 18 | 14.69 |
| 1.786 | 85 | 69.38 | 1.408 | 51 | 41.63 | 1.121 | 17 | 13.87 |
| 1.777 | 84 | 68.57 | 1.398 | 50 | 40.81 | 1.1136 | 16 | 13.06 |
| 1.767 | 83 | 67.75 | 1.3886 | 49 | 40 | 1.106 | 15 | 12.24 |
| 1.756 | 82 | 66.94 | 1.379 | 48 | 39.18 | 1.098 | 14 | 11.42 |
| 1.745 | 81 | 66.12 | 1.370 | 47 | 38.36 | 1.091 | 13 | 10.61 |
| 1.734 | 80 | 65.30 | 1.361 | 46 | 37.55 | 1.083 | 12 | 9.79 |
| 1.722 | 79 | 64.48 | 1.351 | 45 | 36.73 | 1.0756 | 11 | 8.98 |
| 1.700 | 78 | 63.67 | 1.342 | 44 | 35.82 | 1.068 | 10 | 8.16 |
| 1.698 | 77 | 62.85 | 1.333 | 43 | 35.10 | 1.061 | 9 | 7.34 |
| 1.686 | 76 | 62.04 | 1.324 | 42 | 34.28 | 1.0536 | 8 | 6.53 |
| 1.675 | 75 | 61.22 | 1.315 | 41 | 33.47 | 1.0464 | 7 | 5.71 |
| 1.663 | 74 | 60.40 | 1.306 | 40 | 32.65 | 1.039 | 6 | 4.89 |
| 1.651 | 73 | 59.59 | 1.2976 | 39 | 31.83 | 1.032 | 5 | 4.08 |
| 1.639 | 72 | 58.77 | 1.289 | 38 | 31.02 | 1.0256 | 4 | 3.26 |
| 1.627 | 71 | 57.95 | 1.281 | 37 | 30.20 | 1.019 | 3 | 2.445 |
| 1.615 | 70 | 57.14 | 1.272 | 36 | 29.38 | 1.013 | 2 | 1.63 |
| 1.604 | 69 | 56.32 | 1.264 | 35 | 28.57 | 1.0064 | 1 | 0.816 |
| 1.592 | 68 | 55.59 | 1.256 | 34 | 27.75 | | | |
| 1.580 | 67 | 54.69 | 1.2476 | 33 | 26.94 | | | |

## PERCENTAGES OF REAL HYDROCHLORIC ACID (HCl) AND Cl IN AQUEOUS ACID OF VARYING GRAVITY.

(Ure. Temp. 15°.)

| Spec. Gravity. | Per Cent HCl. | Per Cent Cl. | Spec. Gravity. | Per Cent HCl. | Per Cent Cl. | Spec. Gravity. | Per Cent HCl. | Per Cent Cl. |
|---|---|---|---|---|---|---|---|---|
| 1.2000 | 40.777 | 39.675 | 1.1328 | 26.913 | 26.186 | 1.0637 | 13.049 | 12.697 |
| 1.1982 | 40.369 | 39.278 | 1.1308 | 26.505 | 25.789 | 1.0617 | 12.641 | 12.300 |
| 1.1964 | 39.961 | 38.882 | 1.1287 | 26.098 | 25.392 | 1.0597 | 12.233 | 11.903 |
| 1.1946 | 39.554 | 38.485 | 1.1267 | 25.690 | 24.996 | 1.0577 | 11.825 | 11.506 |
| 1.1928 | 39.146 | 38.089 | 1.1247 | 25.282 | 24.599 | 1.0557 | 11.418 | 11.109 |
| 1.1910 | 38.738 | 37.692 | 1.1226 | 24.874 | 24.202 | 1.0537 | 11.010 | 10.712 |
| 1.1893 | 38.330 | 37.296 | 1.1206 | 24.466 | 23.805 | 1.0517 | 10.602 | 10.316 |
| 1.1875 | 37.923 | 36.900 | 1.1185 | 24.058 | 23.408 | 1.0497 | 10.194 | 9.919 |
| 1.1857 | 37.516 | 36.503 | 1.1164 | 23.650 | 23.012 | 1.0477 | 9.786 | 9.522 |
| 1.1846 | 37.108 | 36.107 | 1.1143 | 23.242 | 22.615 | 1.0457 | 9.379 | 9.126 |
| 1.1822 | 36.700 | 35.707 | 1.1123 | 22.834 | 22.218 | 1.0437 | 8.971 | 8.729 |
| 1.1802 | 36.292 | 35.310 | 1.1102 | 22.426 | 21.822 | 1.0417 | 8.563 | 8.332 |
| 1.1782 | 35.884 | 34.913 | 1.1082 | 22.019 | 21.425 | 1.0397 | 8.155 | 7.935 |
| 1.1762 | 35.476 | 34.517 | 1.1061 | 21.611 | 21.028 | 1.0377 | 7.747 | 7.538 |
| 1.1741 | 35.068 | 34.121 | 1.1041 | 21.203 | 20.632 | 1.0357 | 7.340 | 7.141 |
| 1.1721 | 34.660 | 33.724 | 1.1020 | 20.796 | 20.235 | 1.0337 | 6.932 | 6.745 |
| 1.1701 | 34.252 | 33.328 | 1.1000 | 20.388 | 19.837 | 1.0318 | 6.524 | 6.348 |
| 1.1681 | 33.845 | 32.931 | 1.0980 | 19.980 | 19.440 | 1.0298 | 6.116 | 5.951 |
| 1.1661 | 33.437 | 32.535 | 1.0960 | 19.572 | 19.044 | 1.0279 | 5.709 | 5.554 |
| 1.1641 | 33.029 | 32.136 | 1.0939 | 19.165 | 18.647 | 1.0259 | 5.301 | 5.158 |
| 1.1620 | 32.621 | 31.746 | 1.0919 | 18.757 | 18.250 | 1.0239 | 4.893 | 4.762 |
| 1.1599 | 32.213 | 31.343 | 1.0899 | 18.349 | 17.854 | 1.0220 | 4.486 | 4.365 |
| 1.1578 | 31.805 | 30.946 | 1.0879 | 17.941 | 17.457 | 1.0200 | 4.078 | 3.968 |
| 1.1557 | 31.398 | 30.550 | 1.0859 | 17.534 | 17.060 | 1.0180 | 3.670 | 3.571 |
| 1.1537 | 30.990 | 30.153 | 1.0838 | 17.126 | 16.664 | 1.0160 | 3.262 | 3.174 |
| 1.1515 | 30.582 | 29.757 | 1.0818 | 16.718 | 16.267 | 1.0140 | 2.854 | 2.778 |
| 1.1494 | 30.174 | 29.361 | 1.0798 | 16.310 | 15.870 | 1.0120 | 2.447 | 2.381 |
| 1.1473 | 29.767 | 28.994 | 1.0778 | 15.902 | 15.474 | 1.0100 | 2.039 | 1.984 |
| 1.1452 | 29.359 | 28.567 | 1.0758 | 15.494 | 15.077 | 1.0080 | 1.631 | 1.588 |
| 1.1431 | 28.951 | 28.171 | 1.0738 | 15.087 | 14.680 | 1.0060 | 1.124 | 1.191 |
| 1.1410 | 28.544 | 27.772 | 1.0718 | 14.679 | 14.284 | 1.0040 | 0.816 | 0.795 |
| 1.1389 | 28.136 | 27.376 | 1.0697 | 14.271 | 13.887 | 1.0020 | 0.408 | 0.397 |
| 1.1369 | 27.728 | 26.979 | 1.0677 | 13.863 | 13.490 | | | |
| 1.1349 | 27.321 | 26.583 | 1.0657 | 13.456 | 13.049 | | | |

## PERCENTAGES OF REAL NITRIC ACID ($HNO_3$) IN AQUEOUS ACID OF VARYING GRAVITY.

(Kolb, *Ann. Ch. Phys.* (4), 136.)

| $HNO_3$. | Specific Gravity. | | $HNO_3$. | Specific Gravity. | |
|---|---|---|---|---|---|
| Per Cent. | At 0°. | At 15°. | Per Cent. | At 0°. | At 15°. |
| 100.00 | 1.559 | 1.530 | 58.88 | 1.387 | 1.366 |
| 99.84 | 1.559 | 1.530 | 58 | 1.382 | 1.363 |
| 99.72 | 1.558 | 1.530 | 57 | 1.376 | 1.358 |
| 99.52 | 1.557 | 1.529 | 56.10 | 1.371 | 1.353 |
| 97.89 | 1.551 | 1.523 | 55 | 1.365 | 1.346 |
| 97 | 1.548 | 1.520 | 54 | 1.359 | 1.341 |
| 96 | 1.544 | 1.516 | 53.81 | 1.358 | 1.339 |
| 95.27 | 1.542 | 1.514 | 53 | 1.353 | 1.335 |
| 94 | 1.537 | 1.509 | 52.33 | 1.349 | 1.331 |
| 93.01 | 1.533 | 1.506 | 50.99 | 1.341 | 1.323 |
| 92 | 1.529 | 1.503 | 49.97 | 1.334 | 1.317 |
| 91 | 1.526 | 1.499 | 49 | 1.328 | 1.312 |
| 90 | 1.522 | 1.495 | 48 | 1.321 | 1.304 |
| 89.56 | 1.521 | 1.494 | 47.18 | 1.315 | 1.298 |
| 88 | 1.514 | 1.488 | 46.64 | 1.312 | 1.295 |
| 87.45 | 1.513 | 1.486 | 45 | 1.300 | 1.284 |
| 86.17 | 1.507 | 1.482 | 43.53 | 1.291 | 1.274 |
| 85 | 1.503 | 1.478 | 42 | 1.280 | 1.264 |
| 84 | 1.499 | 1.474 | 41 | 1.274 | 1.257 |
| 83 | 1.495 | 1.470 | 40 | 1.267 | 1.251 |
| 82 | 1.492 | 1.467 | 39 | 1.260 | 1.244 |
| 80.96 | 1.488 | 1.463 | 37.95 | 1.253 | 1.237 |
| 80 | 1.484 | 1.460 | 36 | 1.240 | 1.225 |
| 79 | 1.481 | 1.456 | 35 | 1.234 | 1.218 |
| 77.66 | 1.476 | 1.451 | 33.86 | 1.226 | 1.211 |
| 76 | 1.469 | 1.445 | 32 | 1.214 | 1.198 |
| 75 | 1.465 | 1.442 | 31 | 1.207 | 1.192 |
| 74.01 | 1.462 | 1.438 | 30 | 1.200 | 1.185 |
| 73 | 1.457 | 1.435 | 29 | 1.194 | 1.179 |
| [illegible]39 | 1.455 | 1.432 | 28 | 1.187 | 1.172 |
| 71.24 | 1.450 | 1.429 | 27 | 1.180 | 1.166 |
| 69.69 | 1.444 | 1.423 | 25.71 | 1.171 | 1.157 |
| 69.20 | 1.441 | 1.419 | 23 | 1.153 | 1.138 |
| 68 | 1.435 | 1.414 | 20 | 1.132 | 1.120 |
| 67 | 1.430 | 1.410 | 17.47 | 1.115 | 1.105 |
| 66 | 1.425 | 1.405 | 15 | 1.099 | 1.089 |
| 65.07 | 1.420 | 1.400 | 13 | 1.085 | 1.077 |
| 64 | 1.415 | 1.395 | 11.41 | 1.075 | 1.067 |
| 63.59 | 1.413 | 1.393 | 7.22 | 1.050 | 1.045 |
| 62 | 1.404 | 1.386 | 4 | 1.026 | 1.022 |
| 61.21 | 1.400 | 1.381 | 2 | 1.013 | 1.010 |
| 60 | 1.393 | 1.374 | 0 | 1 | 0.999 |
| 59.59 | 1.391 | 1.372 | | | |

## SPECIFIC GRAVITY AND PER CENT OF SOLUTIONS OF PHOSPHORIC ACID AND OXIDE AT 15°.

| Specific Gravity. | Per Ct. $H_3PO_4$. | Per Ct. $P_2O_6$. | Specific Gravity. | Per Ct. $H_3PO_4$. | Per Ct. $P_2O_6$. | Specific Gravity | Per Ct. $H_3PO_4$. | Per Ct. $P_2O_6$. |
|---|---|---|---|---|---|---|---|---|
| 1.0054 | 1 | .726 | 1.1262 | 21 | 15.246 | 1.2731 | 41 | 29.766 |
| 1.0109 | 2 | 1.452 | 1.1329 | 22 | 15.972 | 1.2812 | 42 | 30.492 |
| 1.0164 | 3 | 2.178 | 1.1397 | 23 | 16.698 | 1.2894 | 43 | 31.218 |
| 1.0220 | 4 | 2.904 | 1.1465 | 24 | 17.424 | 1.2976 | 44 | 31.944 |
| 1.0276 | 5 | 3.630 | 1.1534 | 25 | 18.150 | 1.3059 | 45 | 32.670 |
| 1.0333 | 6 | 4.356 | 1.1604 | 26 | 18.876 | 1.3143 | 46 | 33.496 |
| 1.0390 | 7 | 5.082 | 1.1674 | 27 | 19.602 | 1.3227 | 47 | 34.222 |
| 1.0449 | 8 | 5.808 | 1.1745 | 28 | 20.328 | 1.3313 | 48 | 34.948 |
| 1.0508 | 9 | 6.534 | 1.1817 | 29 | 21.054 | 1.3399 | 49 | 35.674 |
| 1.0567 | 10 | 7.26 | 1.1889 | 30 | 21.780 | 1.3486 | 50 | 36.400 |
| 1.0627 | 11 | 7.986 | 1.1962 | 31 | 22.506 | 1.3573 | 51 | 37.126 |
| 1.0688 | 12 | 8.712 | 1.2036 | 32 | 23.232 | 1.3661 | 52 | 37.852 |
| 1 0749 | 13 | 9.438 | 1.2111 | 33 | 23.958 | 1.3750 | 53 | 38.578 |
| 1.0811 | 14 | 10.164 | 1.2186 | 34 | 24.664 | 1.3840 | 54 | 39.304 |
| 1.0874 | 15 | 10.890 | 1.2262 | 35 | 25.410 | 1.3931 | 55 | 40.030 |
| 1.0937 | 16 | 11.616 | 1.2338 | 36 | 26.136 | 1.4022 | 56 | 40.756 |
| 1.1001 | 17 | 12.342 | 1.2415 | 37 | 26.862 | 1.4114 | 57 | 41.482 |
| 1.1065 | 18 | 13.068 | 1.2493 | 38 | 27.588 | 1.4207 | 58 | 42.208 |
| 1.1130 | 19 | 13.794 | 1.2572 | 39 | 28.314 | 1.4301 | 59 | 42.934 |
| 1.1196 | 20 | 14.520 | 1.2651 | 40 | 29.040 | 1.4395 | 60 | 43.660 |

## SPECIFIC GRAVITY AND PER CENT OF SOLUTIONS OF ARSENIC ACID AND OXIDE AT 15°. (KOPP.)

| Spec. Grav. | Per Ct. $H_2AsO_4$. | Per Ct. $As_2O_6$. | Spec. Grav. | Per Ct. $H_3AsO_4$. | Per Ct. $As_2O_3$. | Spec. Grav. | Per Ct. $H_2AsO_4$. | Per Ct. $As_2O_6$. |
|---|---|---|---|---|---|---|---|---|
| 1 | 0. | 0. | 1.45 | 50.40 | 40.55 | 1.90 | 76.30 | 61.85 |
| 1.05 | 7.71 | 6.25 | 1.50 | 53.70 | 43.55 | 1.95 | 78.30 | 63.50 |
| 1.10 | 14.60 | 11.85 | 1.55 | 57.10 | 46.30 | 2.00 | 80.20 | 65 |
| 1.15 | 24.04 | 17.05 | 1.60 | 60.40 | 49 | 2.05 | 82.50 | 66.85 |
| 1.20 | 26.90 | 21.80 | 1.65 | 63.50 | 51.50 | 2.10 | 84.07 | 68.10 |
| 1.25 | 32.20 | 26.15 | 1.70 | 66.40 | 53.80 | 2.15 | 86.40 | 70 |
| 1.30 | 37.20 | 30.15 | 1.75 | 69.10 | 56.00 | 2.20 | 87.90 | 71.25 |
| 1.35 | 41.70 | 33.85 | 1.80 | 71.60 | 58 | 2.25 | 89.50 | 72.55 |
| 1.40 | 46.04 | 37.30 | 1.85 | 74.07 | 60 | 2.30 | 91.10 | 73.85 |

## SPECIFIC GRAVITY AND PER CENT OF SOLUTIONS OF ACETIC ACID AT 15°. (OUDEMANS.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| .9992 | 0 | 1.0363 | 26 | 1.0623 | 51 | 1.0747 | 76 |
| 1.0047 | 1 | 1.0375 | 27 | 1.0631 | 52 | 1.0748 | 77 |
| 1.0022 | 2 | 1.0388 | 28 | 1.0638 | 53 | 1.0748 | 78 |
| 1.0037 | 3 | 1.0400 | 29 | 1.0646 | 54 | 1.0748 | 79 |
| 1.0052 | 4 | 1.0412 | 30 | 1.0653 | 55 | 1.0748 | 80 |
| 1.0067 | 5 | 1.0424 | 31 | 1.0660 | 56 | 1.0747 | 81 |
| 1.0083 | 6 | 1.0436 | 32 | 1.0666 | 57 | 1.0746 | 82 |
| 1.0098 | 7 | 1.0447 | 33 | 1.0673 | 58 | 1.0744 | 83 |
| 1.0113 | 8 | 1.0459 | 34 | 1.0679 | 59 | 1.0742 | 84 |
| 1.0127 | 9 | 1.0470 | 35 | 1.0685 | 60 | 1.0739 | 85 |
| 1.0142 | 10 | 1.0481 | 36 | 1.0691 | 61 | 1.0736 | 86 |
| 1.0157 | 11 | 1.0492 | 37 | 1.0697 | 62 | 1.0731 | 87 |
| 1.0171 | 12 | 1.0502 | 38 | 1.0702 | 63 | 1.0726 | 88 |
| 1.0185 | 13 | 1.0513 | 39 | 1.0707 | 64 | 1.0720 | 89 |
| 1.0200 | 14 | 1.0523 | 40 | 1.0712 | 65 | 1.0713 | 90 |
| 1.0214 | 15 | 1.0533 | 41 | 1.0717 | 66 | 1.0705 | 91 |
| 1.0228 | 16 | 1.0543 | 42 | 1.0721 | 67 | 1.0696 | 92 |
| 1.0242 | 17 | 1.0552 | 43 | 1.0725 | 68 | 1.0686 | 93 |
| 1.0256 | 18 | 1.0562 | 44 | 1.0729 | 69 | 1.0674 | 94 |
| 1.0270 | 19 | 1.0571 | 45 | 1.0733 | 70 | 1.0660 | 95 |
| 1.0284 | 20 | 1.0580 | 46 | 1.0737 | 71 | 1.0644 | 96 |
| 1.0298 | 21 | 1.0589 | 47 | 1.0740 | 72 | 1.0625 | 97 |
| 1.0311 | 22 | 1.0598 | 48 | 1.0742 | 73 | 1.0604 | 98 |
| 1.0324 | 23 | 1.0607 | 49 | 1.0744 | 74 | 1.0580 | 99 |
| 1.0337 | 24 | 1.0615 | 50 | 1.0746 | 75 | 1.0553 | 100 |
| 1.0350 | 25 | | | | | | |

This method cannot be relied on with solutions containing over 78 per cent.

## SPECIFIC GRAVITY AND PER CENT OF CRYSTALLIZED TARTARIC ACID IN WATER AT 15°. (GERLACH.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.0045 | 1 | 1.0761 | 16 | 1.1615 | 32 | 1.2441 | 46 |
| 1.009 | 2 | 1.0865 | 18 | 1.1726 | 34 | 1.2568 | 48 |
| 1.0179 | 4 | 1.0969 | 20 | 1.1840 | 36 | 1.2696 | 50 |
| 1.0273 | 6 | 1.1072 | 22 | 1.1959 | 38 | 1.2828 | 52 |
| 1.0371 | 8 | 1.1175 | 24 | 1.2078 | 40 | 1.2961 | 54 |
| 1.0469 | 10 | 1.1282 | 26 | 1.2198 | 42 | 1.3093 | 56 |
| 1.0565 | 12 | 1.1393 | 28 | 1.2317 | 44 | 1.3220 | 57.9 |
| 1.0661 | 14 | 1.1505 | 30 | | | | |

## SPECIFIC GRAVITY AND PER CENT OF SOLUTIONS OF OXALIC ACID AT 15°. (FRANZ.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.0032 | 1 | 1.0160 | 5 | 1.0226 | 8 | 1.0289 | 11 |
| 1.0064 | 2 | 1.0182 | 6 | 1.0248 | 9 | 1.0309 | 12 |
| 1.0096 | 3 | 1.0204 | 7 | 1.0271 | 10 | 1.0320 | 12.6 |
| 1.0128 | 4 | | | | | | |

## SPECIFIC GRAVITY AND PER CENT OF CITRIC ACID CRYSTALLIZED IN WATER AT 15°. (GERLACH.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.0074 | 2 | 1.0805 | 20 | 1.1612 | 38 | 1.2410 | 54 |
| 1.0149 | 4 | 1.0889 | 22 | 1.1709 | 40 | 1.2514 | 56 |
| 1.0227 | 6 | 1.0972 | 24 | 1.1814 | 42 | 1.2627 | 58 |
| 1.0309 | 8 | 1.1060 | 26 | 1.1899 | 44 | 1.2738 | 60 |
| 1.0392 | 10 | 1.1152 | 28 | 1.1998 | 46 | 1.2849 | 62 |
| 1.0470 | 12 | 1.1244 | 30 | 1.2103 | 48 | 1.2960 | 64 |
| 1.0549 | 14 | 1.1333 | 32 | 1.2204 | 50 | 1.3071 | 66 |
| 1.0632 | 16 | 1.1422 | 34 | 1.2307 | 52 | 1.3076 | 66.1 |
| 1.0718 | 18 | 1.1515 | 36 | | | | |

## SPECIFIC GRAVITY AND PER CENT OF SOLUTIONS OF FORMIC ACID AT 15°.

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.025 | 10 | 1.105 | 40 | 1.161 | 70 | 1.201 | 90 |
| 1.053 | 20 | 1.124 | 50 | 1.180 | 80 | 1.223 | 100 |
| 1.080 | 30 | 1.142 | 60 | | | | |

## SPECIFIC GRAVITY AND PER CENT OF SOLUTIONS OF HYDROFLUO-SILICIC ACID AT 17°.5. (STOLBA.)

| Specific Gravity. | Per Cent $H_2SiFl_6$. | Specific Gravity. | Per Cent $H_2SiFl_6$. | Specific Gravity. | Per Cent $H_2SiFl_6$. | Specific Gravity. | Per Cent $H_2SiFl_6$. |
|---|---|---|---|---|---|---|---|
| 1.3162 | 34 | 1.2285 | 25.5 | 1.1466 | 17 | 1.0704 | 8.5 |
| 1.3109 | 33.5 | 1.2235 | 25 | 1.1419 | 16.5 | 1.0661 | 8 |
| 1.3065 | 33 | 1.2186 | 24.5 | 1.1373 | 16 | 1.0618 | 7.5 |
| 1.3003 | 32.5 | 1.2136 | 24 | 1.1327 | 15.5 | 1.0576 | 7 |
| 1.2951 | 32 | 1.2087 | 23.5 | 1.1281 | 15 | 1.0533 | 6.5 |
| 1.2898 | 31.5 | 1.2038 | 23 | 1.1236 | 14.5 | 1.0491 | 6 |
| 1.2846 | 31 | 1.1989 | 22.5 | 1.1190 | 14 | 1.0449 | 5.5 |
| 1.2794 | 30.5 | 1.1941 | 22 | 1.1145 | 13.5 | 1.0407 | 5 |
| 1.2742 | 30 | 1.1892 | 21.5 | 1.1100 | 13 | 1.0366 | 4.5 |
| 1.2691 | 29.5 | 1.1844 | 21 | 1.1055 | 12.5 | 1.0324 | 4 |
| 1.2659 | 29 | 1.1796 | 20.5 | 1.1011 | 12 | 1.0283 | 3.5 |
| 1.2588 | 28.5 | 1.1748 | 20 | 1.0966 | 11.5 | 1.0242 | 3 |
| 1.2537 | 28 | 1.1701 | 19.5 | 1.0922 | 11 | 1.0201 | 2.5 |
| 1.2486 | 27.5 | 1.1653 | 19 | 1.0878 | 10.5 | 1.0161 | 2 |
| 1.2436 | 27 | 1.1606 | 18.5 | 1.0834 | 10 | 1.0120 | 1.5 |
| 1.2385 | 26.5 | 1.1559 | 18 | 1.0791 | 9.5 | 1.0080 | 1 |
| 1.2335 | 26 | 1.1512 | 17.5 | 1.0747 | 9 | 1.0040 | 0.5 |

## SPECIFIC GRAVITY AND PER CENT OF SOLUTIONS OF HYDROCYANIC ACID. (URE.)

| Specific Gravity. | Per Ct. HCy. | Specific Gravity. | Per Ct. HCy. | Specific Gravity. | Per Ct. HCy. | Specific Gravity. | Per Ct. HCy. |
|---|---|---|---|---|---|---|---|
| .9570 | 16.0 | .9900 | 5.8 | .9952 | 3.2 | .9973 | 2.1 |
| .9768 | 10.6 | .9914 | 5.3 | .9958 | 3.0 | .9974 | 2.0 |
| .9815 | 9.1 | .9923 | 5.0 | .9964 | 2.7 | .9975 | 1.77 |
| .9840 | 8.0 | .9930 | 4.6 | .9967 | 2.5 | .9978 | 1.68 |
| .9870 | 7.3 | .9940 | 4.0 | .9970 | 2.3 | .9979 | 1.60 |
| .9890 | 6.4 | .9945 | 3.6 | | | | |

## SPECIFIC GRAVITY AND PER CENT OF SOLUTIONS OF IODIC ACID AT 14°. (KAMMERER.)

| Specific Gravity. | Per Ct. $I_2O_5$. | Specific Gravity. | Per Ct. $I_2O_5$. | Specific Gravity. | Per Ct. $I_2O_5$. | Specific Gravity. | Per Ct. $I_2O_5$. |
|---|---|---|---|---|---|---|---|
| 1.0053 | 1 | 1.2093 | 20 | 1.5371 | 40 | 1.8689 | 55 |
| 1.0203 | 5 | 1.2773 | 25 | 1.6315 | 45 | 1.9954 | 60 |
| 1.0525 | 10 | 1.3484 | 30 | 1.7256 | 50 | 2.1209 | 65 |
| 1.1223 | 15 | 1.4428 | 35 | | | | |

## SPECIFIC GRAVITY AND PER CENT OF TANNIN SOLUTIONS AT 15°. (TRAMMER.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.0040 | 1.0 | 1.0084 | 2.1 | 1.0124 | 3.1 | 1.0164 | 4.1 |
| 1.0044 | 1.1 | 1.0088 | 2.2 | 1.0128 | 3.2 | 1.0168 | 4.2 |
| 1.0048 | 1.2 | 1.0092 | 2.3 | 1.0132 | 3.3 | 1.0172 | 4.3 |
| 1.0052 | 1.3 | 1.0096 | 2.4 | 1.0136 | 3.4 | 1.0176 | 4.4 |
| 1.0056 | 1.4 | 1.0100 | 2.5 | 1.0140 | 3.5 | 1.0180 | 4.5 |
| 1.0060 | 1.5 | 1.0104 | 2.6 | 1.0144 | 3.6 | 1.0184 | 4.6 |
| 1.0064 | 1.6 | 1.0108 | 2.7 | 1.0148 | 3.7 | 1.0188 | 4.7 |
| 1.0068 | 1.7 | 1.0112 | 2.8 | 1.0152 | 3.8 | 1.0192 | 4.8 |
| 1.0072 | 1.8 | 1.0116 | 2.9 | 1.0156 | 3.9 | 1.0196 | 4.9 |
| 1.0076 | 1.9 | 1.0120 | 3.0 | 1.0160 | 4.0 | 1.0201[illegible] | 5.0 |
| 1.0080 | 2.0 | | | | | | |

## SPECIFIC GRAVITY AND PER CENT OF SOLUTIONS OF HYDROBROMIC ACID AT 15°. (WRIGHT.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.000 | 0 | 1.117 | 15 | 1.252 | 30 | 1.445 | 45 |
| 1.038 | 5 | 1.159 | 20 | 1.305 | 35 | 1.515 | 50 |
| 1.077 | 10 | 1.204 | 25 | 1.365 | 40 | | |

## SPECIFIC GRAVITY AND PER CENT OF SOLUTIONS OF HYDRIODIC ACID AT 15°. (WRIGHT.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.000 | 0 | 1.138 | 15 | 1.296 | 30 | 1.533 | 45 |
| 1.045 | 5 | 1.187 | 20 | 1.361 | 35 | 1.650 | 50 |
| 1.091 | 10 | 1.239 | 25 | 1.438 | 40 | 1.700 | 52 |

## PERCENTAGE OF AMMONIA ($NH_3$) IN AQUEOUS SOLUTIONS OF THE GAS OF VARYING GRAVITY. (CARIUS.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 0.9991 | 0.2 | 0.9688 | 7.5 | 0.9470 | 13.4 | 0.9191 | 22 |
| 0.9983 | 0.4 | 0.9683 | 7.6 | 0.9463 | 13.6 | 0.9185 | 22.2 |
| 0.9975 | 0.6 | 0.9678 | 7.8 | 0.9456 | 13.8 | 0.9180 | 22.4 |
| 0.9667 | 0.8 | 0.9673 | 7.9 | 0.9449 | 14 | 0.9174 | 22.6 |
| 0.9959 | 1 | 0.9669 | 8 | 0.9441 | 14.2 | 0.9168 | 22.8 |
| 0.9950 | 1.2 | 0.9664 | 8.1 | 0.9434 | 14.4 | 0.9162 | 23 |
| 0.9941 | 1.4 | 0.9659 | 8.3 | 0.9427 | 14.6 | 0.9156 | 23.2 |
| 0.9932 | 1.6 | 0.9654 | 8.4 | 0.9420 | 14.8 | 0.9150 | 23.4 |
| 0.9924 | 1.8 | 0.9650 | 8.5 | 0.9414 | 15 | 0.9145 | 23.6 |
| 0.9915 | 2 | 0.9645 | 8.6 | 0.9407 | 15.2 | 0.9139 | 23.8 |
| 0.9907 | 2.2 | 0.9641 | 8.8 | 0.9400 | 15.4 | 0.9133 | 24 |
| 0.9899 | 2.4 | 0.9636 | 8.9 | 0.9393 | 15.6 | 0.9127 | 24.2 |
| 0.9890 | 2.6 | 0.9631 | 9.0 | 0.9386 | 15.8 | 0.9122 | 24.4 |
| 0.9882 | 2.8 | 0.9626 | 9.1 | 0.9380 | 16 | 0.9116 | 24.6 |
| 0.9873 | 3 | 0.9621 | 9.3 | 0.9373 | 16.2 | 0.9111 | 24.8 |
| 0.9863 | 3.2 | 0.9616 | 9.4 | 0.9366 | 16.4 | 0.9106 | 25 |
| 0.9855 | 3.4 | 0.9612 | 9.5 | 0.9360 | 16.6 | 0.9100 | 25.2 |
| 0.9847 | 3.6 | 0.9607 | 9.6 | 0.9353 | 16.8 | 0.9094 | 25.4 |
| 0.9839 | 3.8 | 0.9602 | 9.8 | 0.9347 | 17 | 0.9089 | 25.6 |
| 0.9831 | 4 | 0.9597 | 9.9 | 0.9340 | 17.2 | 0.9083 | 25.8 |
| 0.9823 | 4.2 | 0.9593 | 10 | 0.9333 | 17.4 | 0.9078 | 26 |
| 0.9815 | 4.4 | 0.9588 | 10.1 | 0.9327 | 17.6 | 0.9073 | 26.2 |
| 0.9807 | 4.6 | 0.9583 | 10.3 | 0.9321 | 17.8 | 0.9068 | 26.4 |
| 0.9799 | 4.8 | 0.9578 | 10.4 | 0.9314 | 18 | 0.9063 | 26.6 |
| 0.9783 | 5 | 0.9574 | 10.5 | 0.9308 | 18.2 | 0.9057 | 26.8 |
| 0.9778 | 5.1 | 0.9569 | 10.6 | 0.9302 | 18.4 | 0.9052 | 27 |
| 0.9773 | 5.3 | 0.9564 | 10.8 | 0.9296 | 18.6 | 0.9047 | 27.2 |
| 0.9768 | 5.4 | 0.9559 | 10.9 | 0.9289 | 18.8 | 0.9041 | 27.4 |
| 0.9764 | 5.5 | 0.9556 | 11 | 0.9283 | 19 | 0.9036 | 27.6 |
| 0.9759 | 5.6 | 0.9550 | 11.1 | 0.9277 | 19.2 | 0.9031 | 27.8 |
| 0.9754 | 5.8 | 0.9545 | 11.3 | 0.9271 | 19.4 | 0.9026 | 28 |
| 0.9749 | 5.9 | 0.9540 | 11.4 | 0.9264 | 19.6 | 0.9021 | 28.2 |
| 0.9745 | 6 | 0.9536 | 11.5 | 0.9257 | 19.8 | 0.9016 | 28.4 |
| 0.9735 | 6.3 | 0.9531 | 11.6 | 0.9251 | 20 | 0.9011 | 28.6 |
| 0.9730 | 6.4 | 0.9526 | 11.8 | 0.9245 | 20.2 | 0.9006 | 28.8 |
| 0.9726 | 6.5 | 0.9521 | 11.9 | 0.9239 | 20.4 | 0.9001 | 29 |
| 0.9721 | 6.6 | 0.9517 | 12 | 0.9233 | 20.6 | 0.8996 | 29.2 |
| 0.9716 | 6.8 | 0.9512 | 12.2 | 0.9227 | 20.8 | 0.8991 | 29.4 |
| 0.9711 | 6.9 | 0.9505 | 12.4 | 0.9221 | 21 | 0.8986 | 29.6 |
| 0.9707 | 7 | 0.9498 | 12.6 | 0.9215 | 21.2 | 0.8981 | 29.8 |
| 0.9702 | 7.1 | 0.9491 | 12.8 | 0.9209 | 21.4 | 0.8976 | 30 |
| 0.9697 | 7.3 | 0.9484 | 13 | 0.9203 | 21.6 | 0.8971 | 30.2 |
| 0.9692 | 7.4 | 0.9477 | 13.2 | 0.9197 | 21.8 | 0.8967 | 30.4 |

### AMMONIA PERCENTAGE TABLE—*Continued.*

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 0.8962 | 30.6 | 0.8929 | 32 | 0.8898 | 33.4 | 0.8868 | 34.8 |
| 0.8957 | 30.8 | 0.8925 | 32.2 | 0.8894 | 33.6 | 0.8864 | 35 |
| 0.8953 | 31 | 0.8920 | 32.4 | 0.8889 | 33.8 | 0.8860 | 35.2 |
| 0.8948 | 31.2 | 0.8916 | 32.6 | 0.8885 | 34 | 0.8856 | 35.4 |
| 0.8943 | 31.4 | 0.8911 | 32.8 | 0.8881 | 34.2 | 0.8852 | 35.6 |
| 0.8938 | 31.6 | 0.8907 | 33 | 0.8877 | 34.4 | 0.8848 | 35.8 |
| 0.8934 | 31.8 | 0.8903 | 33.2 | 0.8872 | 34.6 | 0.8844 | 36 |

### TABLE SHOWING SPECIFIC GRAVITY AND PER CENT OF SOLUTION OF SODIUM OXIDE AT 17°.5. (TÜNNERMANN.)

| Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. |
|---|---|---|---|---|---|---|---|
| .302 | 1.0040 | 7.857 | 1.1137 | 15.714 | 1.2453 | 22.967 | 1.3273 |
| .601 | 1.0081 | 8.462 | 1.1233 | 16.319 | 1.2515 | 23.572 | 1.3349 |
| 1.209 | 1.0163 | 9.066 | 1.1330 | 16.923 | 1.2578 | 24.176 | 1.3426 |
| 1.813 | 1.0246 | 9.670 | 1.1428 | 17.528 | 1.2642 | 24.780 | 1.3505 |
| 2.418 | 1.0330 | 10.275 | 1.1528 | 18.132 | 1.2708 | 25.385 | 1.3586 |
| 3 022 | 1.0414 | 10.879 | 1.1630 | 18.730 | 1.2775 | 25.989 | 1.3668 |
| 3.626 | 1.0500 | 11.484 | 1.1734 | 19.341 | 1.2843 | 26.594 | 1.3751 |
| 4.231 | 1.0587 | 12.088 | 1.1841 | 19.954 | 1.2912 | 27.200 | 1.3836 |
| 4.835 | 1.0675 | 12.692 | 1.1948 | 20.550 | 1.2982 | 27.802 | 1.3923 |
| 5.440 | 1.0764 | 13.297 | 1.2058 | 21.154 | 1.3053 | 28.407 | 1.4011 |
| 6.044 | 1.0855 | 13.901 | 1.2178 | 21.758 | 1.3125 | 29.011 | 1.4101 |
| 6.648 | 1.0948 | 14.505 | 1.2280 | 21.894 | 1.3143 | 29.616 | 1.4193 |
| 7.253 | 1.1042 | 15.110 | 1.2392 | 22.363 | 1.3198 | 20.220 | 1.4285 |

### SPECIFIC GRAVITY AND PER CENT OF SALT SOLUTION AT 15°.

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.00725 | 1 | 1.05851 | 8 | 1.11146 | 15 | 1.16755 | 22 |
| 1.01450 | 2 | 1.06593 | 9 | 1.11938 | 16 | 1.17580 | 23 |
| 1.02174 | 3 | 1.07335 | 10 | 1.12730 | 17 | 1.18404 | 24 |
| 1.02899 | 4 | 1.08097 | 11 | 1.13523 | 18 | 1.19228 | 25 |
| 1.03624 | 5 | 1.08859 | 12 | 1.14315 | 19 | 1.20098 | 26 |
| 1.04366 | 6 | 1.09622 | 13 | 1.15107 | 20 | 1.20433 | 26.395 |
| 1.05108 | 7 | 1.10384 | 14 | 1.15931 | 21 | | |

## TABLE SHOWING THE SPECIFIC GRAVITY AND PER CENT OF SOLUTIONS OF POTASSIUM OXIDE AND HYDROXIDE AT 17°.5. (TÜNNERMANN.)

| Per Ct. $K_2O$. | Per Ct. KOH. | Specific Gravity. | Per Ct. $K_2O$. | Per Ct. KOH. | Specific Gravity. | Per Ct. $K_2O$ | Per Ct. KOH. | Specific Gravity. |
|---|---|---|---|---|---|---|---|---|
| .5658 | 0.738 | 1.0050 | 16.408 | 19.542 | 1.1702 | 32.14 | 38.28 | 1.34 |
| 1.697 | 2.021 | 1.0153 | 17.540 | 20.890 | 1.1839 | 33.46 | 39.85 | 1.36 |
| 2.829 | 3.369 | 1.0260 | 18.671 | 2.237 | 1.1979 | 34.74 | 41.37 | 1.38 |
| 3.961 | 4.717 | 1.0369 | 19.803 | 23.585 | 1.2122 | 35.99 | 42.86 | 1.40 |
| 5.002 | 5.957 | 1.0478 | 20.935 | 24.933 | 1.2268 | 37.97 | 45.22 | 1.42 |
| 6.224 | 7.412 | 1.0589 | 21.500 | 25.606 | 1.2342 | 40.17 | 47.84 | 1.44 |
| 7.355 | 8.760 | 1.0703 | 22.632 | 26.954 | 1.2493 | 42.31 | 50.39 | 1.46 |
| 8.487 | 10.108 | 1.0819 | 23.764 | 28.303 | 1.2648 | 44.40 | 52.88 | 1.48 |
| 9.619 | 11.456 | 1.0938 | 24.895 | 29.650 | 1.2805 | 46.45 | 55.32 | 1.50 |
| 10.750 | 12.803 | 1.1059 | 26.027 | 30.998 | 1.2966 | 48.46 | 57.71 | 1.52 |
| 11.882 | 14.151 | 1.1182 | 27.158 | 32.345 | 1.3131 | 50.09 | 59.65 | 1.54 |
| 13.013 | 15.498 | 1.1308 | 28.29 | 33.693 | 1.3300 | 51.58 | 61.43 | 1.56 |
| 14.145 | 16.846 | 1.1437 | 29.34 | 34.94 | 1.30 | 53.06 | 63.19 | 1.58 |
| 15.277 | 18.195 | 1.1568 | 30.74 | 36.91 | 1.32 | | | |

## SPECIFIC GRAVITY AND PER CENT OF SOLUTIONS OF POTASSIUM CHLORIDE AT 15°.

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.00650 | 1 | 1.05248 | 8 | 1.09345 | 14 | 1.13608 | 20 |
| 1.01300 | 2 | 1.05914 | 9 | 1.10036 | 15 | 1.14348 | 21 |
| 1.01950 | 3 | 1.06580 | 10 | 1.10750 | 16 | 1.15088 | 22 |
| 1.02600 | 4 | 1.07271 | 11 | 1.11465 | 17 | 1.15828 | 23 |
| 1.03250 | 5 | 1.07962 | 12 | 1.12179 | 18 | 1.16568 | 24 |
| 1.03916 | 6 | 1.08652 | 13 | 1.12894 | 19 | 1.17234 | 24.9 |
| 1.04582 | 7 | | | | | | |

## SPECIFIC GRAVITY AND PER CENT OF SOLUTIONS OF CALCIUM CHLORIDE AT 18°.3. (SCHIFF.)

| Specific Gravity. | Per Cent $CaCl_2 + 6H_2O$ | Per Cent $CaCl_2$. | Specific Gravity. | Per Cent $CaCl_2 + 6H_2O$ | Per Cent $CaCl_2$. | Specific Gravity. | Per Cent $CaCl_2 + 6H_2O$ | Per Cent $CaCl_2$. |
|---|---|---|---|---|---|---|---|---|
| 1.0039 | 1 | 0.507 | 1.1062 | 25 | 12.670 | 1.2162 | 48 | 24.327 |
| 1.0079 | 2 | 1.014 | 1.1107 | 26 | 13.177 | 1.2212 | 49 | 24.834 |
| 1.0119 | 3 | 1.521 | 1.1153 | 27 | 13.684 | 1.2262 | 50 | 25.340 |
| 1.0159 | 4 | 2.028 | 1.1199 | 28 | 14.191 | 1.2312 | 51 | 25.847 |
| 1.0200 | 5 | 2.534 | 1.1246 | 29 | 14.698 | 1.2363 | 52 | 26.354 |
| 1.0241 | 6 | 3.041 | 1.1292 | 30 | 15.204 | 1.2414 | 53 | 26.861 |
| 1.0282 | 7 | 3.548 | 1.1339 | 31 | 15.711 | 1.2465 | 54 | 27.368 |
| 1.0323 | 8 | 4.055 | 1.1386 | 32 | 16.218 | 1.2516 | 55 | 27.874 |
| 1.0365 | 9 | 4.562 | 1.1433 | 33 | 16.725 | 1.2567 | 56 | 28.381 |
| 1.0407 | 10 | 5.068 | 1.1480 | 34 | 17.232 | 1.2618 | 57 | 28.888 |
| 1.0449 | 11 | 5.575 | 1.1527 | 35 | 17.738 | 1.2969 | 58 | 29.395 |
| 1.0491 | 12 | 6.082 | 1.1575 | 36 | 18.245 | 1.2721 | 59 | 29.902 |
| 1.0534 | 13 | 6.587 | 1.1622 | 37 | 18.752 | 1.2773 | 60 | 30.408 |
| 1.0577 | 14 | 7.096 | 1.1671 | 38 | 19.259 | 1.2825 | 61 | 30.915 |
| 1.0619 | 15 | 7.601 | 1.1719 | 39 | 19.766 | 1.2877 | 62 | 31.422 |
| 1.0663 | 16 | 8.107 | 1.1768 | 40 | 20.272 | 1.2929 | 63 | 31.929 |
| 1.0706 | 17 | 8.611 | 1.1816 | 41 | 20.779 | 1.2981 | 64 | 32.436 |
| 1.0750 | 18 | 9.121 | 1.1865 | 42 | 21.286 | 1.3034 | 65 | 32.942 |
| 1.0794 | 19 | 9.625 | 1.1914 | 43 | 21.793 | 1.3087 | 66 | 33.449 |
| 1.0838 | 20 | 10.136 | 1.1963 | 44 | 22.300 | 1.3140 | 67 | 33.956 |
| 1.0882 | 21 | 10.643 | 1.2012 | 45 | 22.806 | 1.3193 | 68 | 34.863 |
| 1.0927 | 22 | 11.150 | 1.2062 | 46 | 23.313 | 1.3246 | 69 | 34.970 |
| 1.0972 | 23 | 11.657 | 1.2112 | 47 | 23.820 | 1.3300 | 70 | 35.476 |
| 1.1017 | 24 | 12.164 | | | | | | |

## SPECIFIC GRAVITY AND PER CENT OF BARIUM CHLORIDE SOLUTION AT 21°.5. (SCHIFF.)

| Specific Gravity. | Per Cent BaCl $+2H_2O$ | Per Cent $BaCl_2$. | Specific Gravity. | Per Cent BaCl $+2H_2O$ | Per Cent $BaCl_2$. | Specific Gravity. | Per Cent BaCl $+2H_2O$ | Per Cent $BaCl_2$. |
|---|---|---|---|---|---|---|---|---|
| 1.0073 | 1 | 0.853 | 1.0861 | 11 | 9.379 | 1.1783 | 21 | 17.904 |
| 1.0147 | 2 | 1.705 | 1.0947 | 12 | 10.231 | 1.1884 | 22 | 18.756 |
| 1.0222 | 3 | 2.558 | 1.1034 | 13 | 11.084 | 1.1986 | 23 | 19.609 |
| 1.0298 | 4 | 3.410 | 1.1122 | 14 | 11.936 | 1.2090 | 24 | 20.461 |
| 1.0374 | 5 | 4.263 | 1.1211 | 15 | 12.789 | 1.2197 | 25 | 21.314 |
| 1.0452 | 6 | 5.115 | 1.1302 | 16 | 13.641 | 1.2304 | 26 | 22.166 |
| 1.0530 | 7 | 5.968 | 1.1394 | 17 | 14.494 | 1.2413 | 27 | 23.019 |
| 1.0610 | 8 | 6.821 | 1.1488 | 18 | 15.346 | 1.2523 | 28 | 23.871 |
| 1.0692 | 9 | 7.673 | 1.1584 | 19 | 16.199 | 1.2636 | 29 | 24.724 |
| 1.0776 | 10 | 8.526 | 1.1683 | 20 | 17.051 | 1.2750 | 30 | 25.577 |

## SPECIFIC GRAVITY AND PER CENT OF MAGNESIUM CHLORIDE SOLUTION AT 24°. (SCHIFF.)

| Specific Gravity. | Per Cent. | | Specific Gravity. | Per Cent. | | Specific Gravity. | Per Cent. | |
|---|---|---|---|---|---|---|---|---|
| | $MgCl_2 + 6H_2O$ | $MgCl_2$. | | $MgCl_2 + 6H_2O$ | $MgCl_2$. | | $MgCl_2 + 6H_2O$ | $MgCl_2$. |
| 1.0069 | 2 | 0.936 | 1.1062 | 30 | 14.040 | 1.2083 | 56 | 26.208 |
| 1.0138 | 4 | 1.872 | 1.1137 | 32 | 14.976 | 1.2167 | 58 | 27.144 |
| 1.0207 | 6 | 2.808 | 1.1212 | 34 | 15.912 | 1.2252 | 60 | 28.080 |
| 1.0276 | 8 | 3.744 | 1.1288 | 36 | 16.848 | 1.2338 | 62 | 29.016 |
| 1.0345 | 10 | 4.680 | 1.1364 | 38 | 17.784 | 1.2425 | 64 | 29.952 |
| 1.0415 | 12 | 5.616 | 1.1441 | 40 | 18.720 | 1.2513 | 66 | 30.888 |
| 1.0485 | 14 | 6.552 | 1.1519 | 42 | 19.656 | 1 2602 | 68 | 31.824 |
| 1.0556 | 16 | 7.488 | 1.1598 | 44 | 20.592 | 1.2692 | 70 | 32.760 |
| 1.0627 | 18 | 8.424 | 1.1677 | 46 | 21.528 | 1.2783 | 72 | 33.696 |
| 1.0698 | 20 | 9.360 | 1.1756 | 48 | 22.464 | 1.2875 | 74 | 34.632 |
| 1.0770 | 22 | 10.296 | 1.1836 | 50 | 23.400 | 1.2968 | 76 | 35.568 |
| 1.0842 | 24 | 11.232 | 1.1918 | 52 | 24.336 | 1.3063 | 78 | 36.504 |
| 1.0915 | 26 | 12.168 | 1.2000 | 54 | 25.272 | 1.3159 | 80 | 37.440 |
| 1.0988 | 28 | 13.104 | | | | | | |

## SPECIFIC GRAVITY AND PER CENT OF ALUMINIUM CHLORIDE SOLUTION AT 15°. (GERLACH.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.00721 | 1 | 1.08902 | 12 | 1.17953 | 23 | 1.27115 | 33 |
| 1.01443 | 2 | 1.09684 | 13 | 1.18815 | 24 | 1.28080 | 34 |
| 1.02164 | 3 | 1.10460 | 14 | 1.19676 | 25 | 1.29046 | 35 |
| 1.02885 | 4 | 1.11248 | 15 | 1.20584 | 26 | 1.30066 | 36 |
| 1.03603 | 5 | 1.12073 | 16 | 1.21493 | 27 | 1.31086 | 37 |
| 1.04353 | 6 | 1.12897 | 17 | 1.22406 | 28 | 1.32106 | 38 |
| 1.05099 | 7 | 1.13721 | 18 | 1.23310 | 29 | 1.33126 | 39 |
| 1.05845 | 8 | 1.14545 | 19 | 1.24219 | 30 | 1.34146 | 40 |
| 1.06591 | 9 | 1.15370 | 20 | 1.25184 | 31 | 1.35224 | 41 |
| 1.07337 | 10 | 1.16231 | 21 | 1.26149 | 32 | 1.35359 | 41.126 |
| 1.08120 | 11 | 1.17092 | 22 | | | | |

## SPECIFIC GRAVITY AND PER CENT OF AMMONIUM CHLORIDE SOLUTION AT 15°.

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.00316 | 1 | 1.02481 | 8 | 1.04524 | 15 | 1.06479 | 22 |
| 1.00632 | 2 | 1.02781 | 9 | 1.04805 | 16 | 1.06754 | 23 |
| 1.00948 | 3 | 1.03081 | 10 | 1.05086 | 17 | 1.07029 | 24 |
| 1.01264 | 4 | 1.03370 | 11 | 1.05367 | 18 | 1.07304 | 25 |
| 1.01580 | 5 | 1.03658 | 12 | 1.05648 | 19 | 1.07575 | 26 |
| 1.01880 | 6 | 1.03947 | 13 | 1.05929 | 20 | 1.07658 | 26.297 |
| 1.02180 | 7 | 1.04325 | 14 | 1.06204 | 21 | | |

## SPECIFIC GRAVITY AND PER CENT OF COPPER CHLORIDE SOLUTION AT 17°.5. (FRANZ.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.0182 | 2 | 1.1178 | 12 | 1.2501 | 22 | 1.3950 | 32 |
| 1.0364 | 4 | 1.1436 | 14 | 1.2779 | 24 | 1.4287 | 34 |
| 1.0548 | 6 | 1.1696 | 16 | 1.3058 | 26 | 1.4615 | 36 |
| 1.0734 | 8 | 1.1958 | 18 | 1.3338 | 28 | 1.4949 | 38 |
| 1.0920 | 10 | 1.2223 | 20 | 1.3618 | 30 | 1.5281 | 40 |

## SPECIFIC GRAVITY AND PER CENT OF STANNIC CHLORIDE SOLUTION AT 15°. (GERLACH.)

| Specific Gravity. | Per Cent $SnCl_4$ $+5H_2O$ | Specific Gravity. | Per Cent $SnCl_4$ $+5H_2O$ | Specific Gravity. | Per Cent $SnCl_4$ $+5H_2O$ | Specific Gravity. | Per Cent $SnCl^4$ $+5H_2O$ |
|---|---|---|---|---|---|---|---|
| 1.012 | 2 | 1.165 | 26 | 1.366 | 50 | 1.641 | 74 |
| 1.024 | 4 | 1.180 | 28 | 1.386 | 52 | 1.669 | 76 |
| 1.036 | 6 | 1.195 | 30 | 1.406 | 54 | 1.698 | 78 |
| 1.048 | 8 | 1.210 | 32 | 1.426 | 56 | 1.727 | 80 |
| 1.059 | 10 | 1.2268 | 34 | 1.447 | 58 | 1.759 | 82 |
| 1.072 | 12 | 1.242 | 36 | 1.468 | 60 | 1.791 | 84 |
| 1.084 | 14 | 1.259 | 38 | 1.491 | 62 | 1.824 | 86 |
| 1.097 | 16 | 1.2755 | 40 | 1.514 | 64 | 1.859 | 88 |
| 1.110 | 18 | 1.293 | 42 | 1.538 | 66 | 1.893 | 90 |
| 1.1236 | 20 | 1.310 | 44 | 1.563 | 68 | 1.932 | 92 |
| 1.137 | 22 | 1.329 | 46 | 1.587 | 70 | 1.969 | 94 |
| 1.157 | 24 | 1.347 | 48 | 1.614 | 72 | 1.988 | 96 |

## SPECIFIC GRAVITY AND PER CENT OF BARIUM NITRATE SOLUTION AT 19°.5. (KREMERS.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.017 | 2 | 1.037 | 10 | 1.049 | 6 | 1.181 | 20 |
| 1.037 | 4 |  | $Sr(NO_3)_2$ | 1.068 | 8 | 1.292 | 30 |
| 1.050 | 6 | 1.017 | 2 | 1.085 | 10 | 1.422 | 40 |
| 1.069 | 8 | 1.034 | 4 | 1.131 | 15 |  |  |

## SPECIFIC GRAVITY AND PER CENT OF CALCIUM NITRATE SOLUTION AT 17°.5. (FRANZ.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|
| 1.0078 | 10 | 1.2724 | 30 | 1.5148 | 50 |
| 1.1736 | 20 | 1.3846 | 40 | 1.6660 | 60 |

## SPECIFIC GRAVITY AND PER CENT OF PLATINUM-CHLORIDE SOLUTION. (PRECHT.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.009 | 1 | 1.141 | 14 | 1.315 | 27 | 1.523 | 39 |
| 1.018 | 2 | 1.153 | 15 | 1.330 | 28 | 1.546 | 40 |
| 1.027 | 3 | 1.165 | 16 | 1.346 | 29 | 1.568 | 41 |
| 1.036 | 4 | 1.176 | 17 | 1.362 | 30 | 1.591 | 42 |
| 1.046 | 5 | 1.188 | 18 | 1.387 | 31 | 1.615 | 43 |
| 1.056 | 6 | 1.201 | 19 | 1.395 | 32 | 1.641 | 44 |
| 1.066 | 7 | 1.214 | 20 | 1.413 | 33 | 1.666 | 45 |
| 1.076 | 8 | 1.227 | 21 | 1.431 | 34 | 1.688 | 46 |
| 1.086 | 9 | 1.242 | 22 | 1.450 | 35 | 1.712 | 47 |
| 1.097 | 10 | 1.256 | 23 | 1.469 | 36 | 1.736 | 48 |
| 1.108 | 11 | 1.270 | 24 | 1.488 | 37 | 1.760 | 49 |
| 1.119 | 12 | 1.285 | 25 | 1.500 | 38 | 1.785 | 50 |
| 1.130 | 13 | 1.300 | 26 |  |  |  |  |

## SPECIFIC GRAVITY AND PER CENT OF STANNOUS-CHLORIDE SOLUTION AT 15°. (GERLACH.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.013 | 2 | 1.161 | 22 | 1.352 | 42 | 1.582 | 60 |
| 1.026 | 4 | 1.177 | 24 | 1.374 | 44 | 1.613 | 62 |
| 1.040 | 6 | 1.194 | 26 | 1.397 | 46 | 1.644 | 64 |
| 1.054 | 8 | 1.212 | 28 | 1.421 | 48 | 1.677 | 66 |
| 1.068 | 10 | 1.230 | 30 | 1.445 | 50 | 1.711 | 68 |
| 1.083 | 12 | 1.249 | 32 | 1.471 | 52 | 1.745 | 70 |
| 1.097 | 14 | 1.268 | 34 | 1.497 | 54 | 1.783 | 72 |
| 1.113 | 16 | 1.288 | 36 | 1.525 | 56 | 1.821 | 74 |
| 1.128 | 18 | 1.309 | 38 | 1 554 | 58 | 1.840 | 75 |
| 1.144 | 20 | 1.330 | 40 | | | | |

## SPECIFIC GRAVITY AND PER CENT OF SODIUM-NITRATE SOLUTION AT 25°.2.

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.0065 | 1 | 1.0962 | 14 | 1.1987 | 27 | 1.3055 | 39 |
| 1.0131 | 2 | 1.1035 | 15 | 1.2070 | 28 | 1.3155 | 40 |
| 1.0197 | 3 | 1.1109 | 16 | 1.2154 | 29 | 1.3255 | 41 |
| 1.0264 | 4 | 1.1184 | 17 | 1.2239 | 30 | 1.3355 | 42 |
| 1.0332 | 5 | 1.1260 | 18 | 1.2325 | 31 | 1.3456 | 43 |
| 1.0399 | 6 | 1.1338 | 19 | 1.2412 | 32 | 1.3557 | 44 |
| 1.0468 | 7 | 1.1418 | 20 | 1.2500 | 33 | 1.3659 | 45 |
| 1.0537 | 8 | 1.1498 | 21 | 1.2589 | 34 | 1.3761 | 46 |
| 1.0606 | 9 | 1.1578 | 22 | 1.2679 | 35 | 1.3864 | 47 |
| 1.0676 | 10 | 1.1659 | 23 | 1.2770 | 36 | 1.3968 | 48 |
| 1.0746 | 11 | 1.1740 | 24 | 1.2863 | 37 | 1.4074 | 49 |
| 1.0817 | 12 | 1.1822 | 25 | 1.2958 | 38 | 1.4180 | 50 |
| 1.0889 | 13 | 1.1904 | 26 | | | | |

## SPECIFIC GRAVITY AND PER CENT OF SODIUM-SULPHATE SOLUTION AT 19°.

| Specific Gravity. | Per Cent. | | Specific Gravity. | Per Cent. | |
|---|---|---|---|---|---|
| | $Na_2SO_4 + 10H_2O$. | $Na_2SO_4$. | | $Na_2SO_4 + 10H_2O$. | $Na_2SO_4$. |
| 1.0040 | 1 | .441 | 1.0642 | 16 | 7.056 |
| 1.0079 | 2 | .881 | 1.0683 | 17 | 7.497 |
| 1.0118 | 3 | 1.323 | 1.0725 | 18 | 7.938 |
| 1.0158 | 4 | 1.764 | 1.0766 | 19 | 8.379 |
| 1.0198 | 5 | 2.205 | 1.0807 | 20 | 8.820 |
| 1.0238 | 6 | 2.646 | 1.0849 | 21 | 9.261 |
| 1.0278 | 7 | 3.087 | 1.0890 | 22 | 9.702 |
| 1.0318 | 8 | 3.528 | 1.0931 | 23 | 10.143 |
| 1.0358 | 9 | 3.969 | 1.0973 | 24 | 10.584 |
| 1.0398 | 10 | 4.410 | 1.1015 | 25 | 11.025 |
| 1.0439 | 11 | 4.851 | 1.1057 | 26 | 11.466 |
| 1.0479 | 12 | 5.292 | 1.1100 | 27 | 11.907 |
| 1.0520 | 13 | 5.373 | 1.1142 | 28 | 12.348 |
| 1.0560 | 14 | 6.174 | 1.1184 | 29 | 12.789 |
| 1.0601 | 15 | 6.615 | 1.1226 | 30 | 13.230 |

## SPECIFIC GRAVITY AND PER CENT OF AMMONIUM-SULPHATE SOLUTION AT 19°. (SCHIFF.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.0057 | 1 | 1.0805 | 14 | 1.1554 | 27 | 1.2228 | 39 |
| 1.0115 | 2 | 1.0862 | 15 | 1.1612 | 28 | 1.2284 | 40 |
| 1.0172 | 3 | 1.0920 | 16 | 1.1670 | 29 | 1.2343 | 41 |
| 1.0230 | 4 | 1.0977 | 17 | 1.1724 | 30 | 1.2402 | 42 |
| 1.0287 | 5 | 1.1035 | 18 | 1.1780 | 31 | 1.2462 | 43 |
| 1.0345 | 6 | 1.1092 | 19 | 1.1836 | 32 | 1.2522 | 44 |
| 1.0403 | 7 | 1.1149 | 20 | 1.1892 | 33 | 1.2583 | 45 |
| 1.0460 | 8 | 1.1207 | 21 | 1.1948 | 34 | 1.2644 | 46 |
| 1.0518 | 9 | 1.1265 | 22 | 1.2004 | 35 | 1.2705 | 47 |
| 1.0575 | 10 | 1.1323 | 23 | 1.2060 | 36 | 1.2766 | 48 |
| 1.0632 | 11 | 1.1381 | 24 | 1.2116 | 37 | 1.2828 | 49 |
| 1.0690 | 12 | 1.1439 | 25 | 1.2172 | 38 | 1.2890 | 50 |
| 1.0747 | 13 | 1.1496 | 26 | | | | |

## SPECIFIC GRAVITY AND PER CENT OF VARIOUS SOLUTIONS AT 17°.5. (Franz.)

### Silver Nitrate.

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|
| 1.041 | 5 | 1.080 | 10 | 1.160 | 20 |
| 1.050 | 6 | 1.100 | 12 | 1.206 | 25 |
| 1.058 | 7 | 1.125 | 15 | 1.251 | 30 |
| 1.064 | 8 | 1.150 | 18 | | |

### Copper Nitrate.

| | | | | | |
|---|---|---|---|---|---|
| 1.0942 | 10 | 1.3299 | 30 | 1.5404 | 44 |
| 1.2037 | 20 | 1.4724 | 40 | | |

### Lead Nitrate.

| | | | | | |
|---|---|---|---|---|---|
| 1.0869 | 10 | 1.3140 | 30 | 1.3996 | 40 |
| 1.1902 | 20 | | | | |

### Cobalt Nitrate.

| | | | | | |
|---|---|---|---|---|---|
| 1.0906 | 10 | 1.3190 | 30 | 1.4662 | 40 |
| 1.1936 | 20 | | | | |

### Cadmium Nitrate.

| | | | | | |
|---|---|---|---|---|---|
| 1.0978 | 10 | 1.3566 | 30 | 1.7608 | 50 |
| 1.2134 | 20 | 1.5372 | 40 | | |

### Zinc Nitrate.

| | | | | | |
|---|---|---|---|---|---|
| 1.0968 | 10 | 1.3268 | 30 | 1.5984 | 50 |
| 1.2024 | 20 | 1.4572 | 40 | | |

### Iron Nitrate.

| | | | | | |
|---|---|---|---|---|---|
| 1.0770 | 10 | 1.2622 | 30 | 1.4972 | 50 |
| 1.1612 | 20 | 1.3746 | 40 | 1.6572 | 60 |

### SPECIFIC GRAVITY AND PER CENT OF POTASSIUM NITRATE SOLUTION AT 21°.

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.0058 | 1 | 1.0425 | 7 | 1.0819 | 13 | 1.1242 | 19 |
| 1.0118 | 2 | 1.0490 | 8 | 1.0887 | 14 | 1.1316 | 20 |
| 1.0178 | 3 | 1.0555 | 9 | 1.0956 | 15 | 1.1390 | 21 |
| 1.0239 | 4 | 1.0621 | 10 | 1.1026 | 16 | 1.1464 | 22 |
| 1.0300 | 5 | 1.0686 | 11 | 1.1097 | 17 | 1.1539 | 23 |
| 1.0363 | 6 | 1.0752 | 12 | 1.1160 | 18 | 1.1613 | 24 |

### SPECIFIC GRAVITY AND PER CENT OF POTASSIUM FERRO CYANIDE SOLUTION AT 15°.

| Specific Gravity. | Per Cent. | | Specific Gravity. | Per Cent. | |
|---|---|---|---|---|---|
| | $K_4Fe(Cn)_6 + 3H_2O$. | $K_4Fe(Cn)_6$. | | $K_4Fe(Cn)_6 + 3H_2O$. | $K_4Fe(Cn)_6$. |
| 1.0058 | 1 | 0.872 | 1.0669 | 11 | 9.592 |
| 1.0116 | 2 | 1.744 | 1.0734 | 12 | 10.464 |
| 1.0175 | 3 | 2.616 | 1.0800 | 13 | 11.336 |
| 1.0234 | 4 | 3.488 | 1.0866 | 14 | 12.208 |
| 1.0295 | 5 | 4.360 | 1.0932 | 15 | 13.080 |
| 1.0356 | 6 | 5.232 | 1.0999 | 16 | 13.952 |
| 1.0417 | 7 | 6.104 | 1.1067 | 17 | 14.824 |
| 1.0479 | 8 | 6.976 | 1.1136 | 18 | 15.696 |
| 1.0542 | 9 | 7.848 | 1.1205 | 19 | 16.568 |
| 1.0605 | 10 | 8.720 | 1.1275 | 20 | 17.440 |

### SPECIFIC GRAVITY AND PER CENT OF MAGNESIUM SULPHATE SOLUTION AT 15°. (GERLACH.)

| Specific Gravity. | Per Cent. | | Specific Gravity. | Per Cent. | |
|---|---|---|---|---|---|
| | $MgSO_4$. | $MgSO_4 + 7H_2O$. | | $MgSO_4$. | $MgSO_4 + 7H_2O$. |
| 1.02062 | 2 | 4.097 | 1.17420 | 16 | 32.780 |
| 1.04123 | 4 | 8.195 | 1.19816 | 18 | 36.877 |
| 1.06229 | 6 | 12.292 | 1.22216 | 20 | 40.975 |
| 1.08379 | 8 | 16.390 | 1.24718 | 22 | 45.072 |
| 1.10529 | 10 | 20.487 | 1.27225 | 24 | 49.170 |
| 1.12806 | 12 | 24.585 | 1.28802 | 25.25 | 51.726 |
| 1.15083 | 14 | 28.682 | | | |

## SPECIFIC GRAVITY AND PER CENT OF VARIOUS SOLUTIONS AT 15°. (GERLACH.)

### ZINC SULPHATE.

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|
| 1.0288 | 5 | 1.1574 | 25 | 1.2709 | 40 |
| 1.0593 | 10 | 1.1932 | 30 | 1.310 | 45 |
| 1.0905 | 15 | 1.231 | 35 | 1.2522 | 50 |
| 1.1236 | 20 | | | | |

### ALUMINIUM POTASSIUM SULPHATE.

| | | | | | |
|---|---|---|---|---|---|
| 1.0065 | 1 | 1.0166 | 3 | 1.0269 | 5 |
| 1.0110 | 2 | 1.0218 | 4 | 1.0320 | 6 |

### POTASSIUM SULPHATE.

| | | | | | |
|---|---|---|---|---|---|
| 1.00820 | 1 | 1.04105 | 5 | 1.06644 | 8 |
| 1 01635 | 2 | 1.04947 | 6 | 1.07499 | 9 |
| 1.02450 | 3 | 1.05790 | 7 | 1.08305 | 9.92 |
| 1.03277 | 4 | | | | |

### SODIUM SULPHATE.

| | | | | | |
|---|---|---|---|---|---|
| 1.01911 | 1 | 1.04576 | 5 | 1.08325 | 9 |
| 1.01822 | 2 | 1.05500 | 6 | 1.09275 | 10 |
| 1.02736 | 3 | 1.06437 | 7 | 1.10246 | 11 |
| 1.03650 | 4 | 1.07375 | 8 | 1.11170 | 11.952 |

### AMMONIUM ALUMINIUM SULPHATE.

| | | | | | |
|---|---|---|---|---|---|
| 1.0060 | 1 | 1.0156 | 3 | 1.0255 | 5 |
| 1.0109 | 2 | 1.0200 | 4 | 1.0305 | 6 |

### POTASSIUM CHROMIUM SULPHATE.

| | | | | | |
|---|---|---|---|---|---|
| 1.0174 | 5 | 1.1274 | 30 | 1.4566 | 60 |
| 1.0342 | 10 | 1.1896 | 40 | 1.6362 | 70 |
| 1.0746 | 20 | 1.2894 | 50 | | |

## SPECIFIC GRAVITY AND CONTENTS OF A SOLUTION OF LEAD ACETATE AT 20°. (SALOMON.)

| Gram'es in 100 C. C. | Specific Gravity. | Gram'es in 100 C. C. | Specific Gravity. | Gram'es in 100 C. C. | Specific Gravity. | Gram'es in 100 C. C. | Specific Gravity. |
|---|---|---|---|---|---|---|---|
| 1 | 1.0062 | 14 | 1.0870 | 27 | 1.1663 | 39 | 1.2380 |
| 2 | 1.0124 | 15 | 1.0932 | 28 | 1.1723 | 40 | 1.2440 |
| 3 | 1.0186 | 16 | 1.0994 | 29 | 1.1783 | 41 | 1.2499 |
| 4 | 1.0248 | 17 | 1.1056 | 30 | 1.1844 | 42 | 1.2558 |
| 5 | 1.0311 | 18 | 1.1118 | 31 | 1.1903 | 43 | 1.2617 |
| 6 | 1.0373 | 19 | 1.1180 | 32 | 1.1963 | 44 | 1.2676 |
| 7 | 1.0435 | 20 | 1.1242 | 33 | 1.2022 | 45 | 1.2735 |
| 8 | 1.0497 | 21 | 1.1302 | 34 | 1.2082 | 46 | 1.2794 |
| 9 | 1.0559 | 22 | 1.1362 | 35 | 1.2142 | 47 | 1.2853 |
| 10 | 1.0622 | 23 | 1.1422 | 36 | 1.2201 | 48 | 1.2912 |
| 11 | 1.0684 | 24 | 1.1482 | 37 | 1.2261 | 49 | 1.2971 |
| 12 | 1.0746 | 25 | 1.1543 | 38 | 1.2320 | 50 | 1.3030 |
| 13 | 1.0808 | 26 | 1.1603 | | | | |

## SPECIFIC GRAVITY AND PER CENT OF POTASSIUM CHROMATE SOLUTION AT 19°.5. (SCHIFF.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.0080 | 1 | 1.0925 | 11 | 1.1864 | 21 | 1.2921 | 31 |
| 1.0161 | 2 | 1.1014 | 12 | 1.1964 | 22 | 1.3035 | 32 |
| 1.0243 | 3 | 1.1104 | 13 | 1.2066 | 23 | 1.3151 | 33 |
| 1.0325 | 4 | 1.1195 | 14 | 1.2169 | 24 | 1.3268 | 34 |
| 1.0408 | 5 | 1.1287 | 15 | 1.2274 | 25 | 1.3386 | 35 |
| 1.0492 | 6 | 1.1380 | 16 | 1.2379 | 26 | 1.3505 | 36 |
| 1.0576 | 7 | 1.1474 | 17 | 1.2485 | 27 | 1.3625 | 37 |
| 1.0663 | 8 | 1.1570 | 18 | 1.2592 | 28 | 1.3746 | 38 |
| 1.0750 | 9 | 1.1667 | 19 | 1.2700 | 29 | 1.3868 | 39 |
| 1.0837 | 10 | 1.1765 | 20 | 1.2808 | 30 | 1.3991 | 40 |

## SPECIFIC GRAVITY AND PER CENT OF SOLUTIONS OF POTASSIUM FERRI-CYANIDE AT 15°.

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.0051 | 1 | 1.0315 | 6 | 1.0653 | 12 | 1.1266 | 22 |
| 1.0103 | 2 | 1.0370 | 7 | 1.0771 | 14 | 1.1396 | 24 |
| 1.0155 | 3 | 1.0426 | 8 | 1.0891 | 16 | 1.1529 | 26 |
| 1.0208 | 4 | 1.0482 | 9 | 1.1014 | 18 | 1.1664 | 28 |
| 1.0261 | 5 | 1.0538 | 10 | 1.1139 | 20 | 1.1802 | 30 |

## SPECIFIC GRAVITY AND PER CENT OF SODIUM-HYPOSULPHITE SOLUTION AT 19°.

| Specific Gravity. | Per Cent. | | Specific Gravity. | Per Cent. | |
|---|---|---|---|---|---|
| | $Na_2S_2O_3 + 5H_2O$. | $Na_2S_2O_3$. | | $Na_2S_2O_3 + 5H_2O$. | $Na_2S_2O_3$. |
| 1.0052 | 1 | 0.637 | 1.1440 | 26 | 16.564 |
| 1.0105 | 2 | 1.274 | 1.1499 | 27 | 17.021 |
| 1.0158 | 3 | 1.911 | 1.1558 | 28 | 17.838 |
| 1.0211 | 4 | 2.584 | 1.1617 | 29 | 18.475 |
| 1.0264 | 5 | 3.185 | 1.1676 | 30 | 19.113 |
| 1.0317 | 6 | 3.822 | 1.1738 | 31 | 19.750 |
| 1.0370 | 7 | 4.459 | 1.1800 | 32 | 20.387 |
| 1.0423 | 8 | 5.096 | 1.1862 | 33 | 21.024 |
| 1.0476 | 9 | 5.733 | 1.1924 | 34 | 21.661 |
| 1.0529 | 10 | 6.371 | 1.1986 | 35 | 22.298 |
| 1.0584 | 11 | 7.008 | 1.2048 | 36 | 22.935 |
| 1.0639 | 12 | 7.645 | 1.2110 | 37 | 23.572 |
| 1.0695 | 13 | 8.282 | 1.2172 | 38 | 24.209 |
| 1.0751 | 14 | 9.919 | 1.2234 | 39 | 24.846 |
| 1.0807 | 15 | 9.556 | 1.2297 | 40 | 25.484 |
| 1.0863 | 16 | 10.193 | 1.2362 | 41 | 26.121 |
| 1.0919 | 17 | 10.830 | 1.2427 | 42 | 26.758 |
| 1.0975 | 18 | 11.467 | 1.2492 | 43 | 27.395 |
| 1.1031 | 19 | 12.105 | 1.2558 | 44 | 28.032 |
| 1.1087 | 20 | 12.742 | 1.2624 | 45 | 28.669 |
| 1.1145 | 21 | 13.379 | 1.2690 | 46 | 29.306 |
| 1.1204 | 22 | 14.016 | 1.2756 | 47 | 29.943 |
| 1.1263 | 23 | 14.653 | 1.2822 | 48 | 30.580 |
| 1.1322 | 24 | 15.290 | 1.2888 | 49 | 31.218 |
| 1.1381 | 25 | 15.927 | 1.2954 | 50 | 31.855 |

## SPECIFIC GRAVITY AND PER CENT OF POTASSIUM BICHROMATE SOLUTION AT 19°.5.

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|
| 1.0405 | 5.731 | 1.0847 | 11.583 |

## SPECIFIC GRAVITY AND PER CENT OF IRON SULPHATE SOLUTION AT 15°.

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.011 | 2 | 1.043 | 8 | 1.082 | 15 | 1.174 | 30 |
| 1.021 | 4 | 1.054 | 10 | 1.112 | 20 | 1.206 | 35 |
| 1.032 | 6 | 1.065 | 12 | 1.143 | 25 | 1.239 | 40 |

## SPECIFIC GRAVITY AND PER CENT OF COPPER SULPHATE SOLUTION AT 15°.

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.0126 | 2 | 1.0516 | 8 | 1.0033 | 14 | 1.1354 | 20 |
| 1.0254 | 4 | 1.0649 | 10 | 1.1063 | 16 | 1.1501 | 22 |
| 1.0384 | 6 | 1.0785 | 12 | 1.1208 | 18 | 1.1659 | 24 |

## SPECIFIC GRAVITY AND PER CENT OF POTASSIUM-CARBONATE SOLUTION AT 15°. (GERLACH.)

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.00914 | 1 | 1.14179 | 15 | 1.27893 | 28 | 1.43104 | 41 |
| 1.01829 | 2 | 1.15200 | 16 | 1.28999 | 29 | 1.44338 | 42 |
| 1.02743 | 3 | 1,16222 | 17 | 1.30105 | 30 | 1 45573 | 43 |
| 1.03658 | 4 | 1.17243 | 18 | 1.31261 | 31 | 1.46807 | 44 |
| 1.04572 | 5 | 1.18265 | 19 | 1.32417 | 32 | 1.48041 | 45 |
| 1.05513 | 6 | 1.19286 | 20 | 1.33573 | 33 | 1.49314 | 46 |
| 1.06454 | 7 | 1.20344 | 21 | 1.34729 | 34 | 1.50588 | 47 |
| 1.07396 | 8 | 1.21402 | 22 | 1.35885 | 35 | 1.51861 | 48 |
| 1.08337 | 9 | 1.22459 | 23 | 1.37082 | 36 | 1.53135 | 49 |
| 1.09278 | 10 | 1.23517 | 24 | 1.38279 | 37 | 1.54408 | 50 |
| 1.10258 | 11 | 1.24575 | 25 | 1.39476 | 38 | 1.55728 | 51 |
| 1.11238 | 12 | 1.25681 | 26 | 1.40673 | 39 | 1.57548 | 52 |
| 1,12219 | 13 | 1.2[illegible]787 | 27 | 1.41870 | 40 | 1.57079 | 52.024 |
| 1.13199 | 14 | 6 | | | | | |

## SPECIFIC GRAVITY AND PER CENT OF SODIUM CARBONATE SOLUTION AT 23°. (SCHIFF.)

| Specific Gravity. | Per Cent. | | Specific Gravity. | Per Cent. | |
|---|---|---|---|---|---|
| | $Na_2CO_3 + 10H_2O$. | $Na_2CO_3$. | | $Na_2CO_3 + 10H_2$. | $Na_2CO_3$. |
| 1.0038 | 1 | .370 | 1.1035 | 26 | 9.635 |
| 1.0076 | 2 | .741 | 1.1076 | 27 | 10.005 |
| 1.0114 | 3 | 1.112 | 1.1117 | 28 | 10.376 |
| 1.0153 | 4 | 1.482 | 1.1158 | 29 | 10.746 |
| 1.0192 | 5 | 1.853 | 1.1200 | 30 | 11.118 |
| 1.0231 | 6 | 2.223 | 1.1242 | 31 | 11.488 |
| 1.0270 | 7 | 2.594 | 1.1284 | 32 | 11.859 |
| 1.0309 | 8 | 2.965 | 1.1326 | 33 | 12.230 |
| 1.0348 | 9 | 3.335 | 1.1368 | 34 | 12.600 |
| 1.0388 | 10 | 3.706 | 1.1410 | 35 | 12.971 |
| 1.0428 | 11 | 4.076 | 1.1452 | 36 | 13.341 |
| 1.0468 | 12 | 4.447 | 1.1494 | 37 | 13.712 |
| 1.0508 | 13 | 4.817 | 1.1536 | 38 | 14.082 |
| 1.0548 | 14 | 5.188 | 1.1578 | 39 | 14.453 |
| 1.0588 | 15 | 5.558 | 1.1620 | 40 | 14.824 |
| 1.0628 | 16 | 5.929 | 1.1662 | 41 | 14.195 |
| 1.0668 | 17 | 6.299 | 1.1704 | 42 | 15.566 |
| 1.0708 | 18 | 6.670 | 1.1746 | 43 | 15.936 |
| 1.0748 | 19 | 7.041 | 1.1788 | 44 | 16.307 |
| 1.0789 | 20 | 7.412 | 1.1830 | 45 | 16.677 |
| 1.0830 | 21 | 7.782 | 1.1873 | 46 | 17.048 |
| 1.0871 | 22 | 8.153 | 1.1916 | 47 | 17.418 |
| 1.0912 | 23 | 8.523 | 1.1959 | 48 | 17.789 |
| 1.0953 | 24 | 8.894 | 1.2002 | 49 | 18.159 |
| 1.0994 | 25 | 9.264 | 1.2045 | 50 | 18.530 |

## SPECIFIC GRAVITY AND PER CENT OF AMMONIUM CARBONATE SOLUTION AT 15°.

| Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. | Specific Gravity. | Per Cent. |
|---|---|---|---|---|---|---|---|
| 1.005 | 1.66 | 1.045 | 13.36 | 1.080 | 23.78 | 1.115 | 35.08 |
| 1.010 | 3.18 | 1.050 | 14.83 | 1.085 | 25.31 | 1.120 | 36.88 |
| 1.015 | 4.60 | 1.055 | 16.16 | 1.090 | 26.82 | 1.125 | 38.71 |
| 1.020 | 6.04 | 1.060 | 17.70 | 1.095 | 28.33 | 1.130 | 40.34 |
| 1.025 | 7.49 | 1.065 | 19.18 | 1.000 | 29.93 | 1.135 | 42.20 |
| 1.030 | 8.93 | 1.070 | 20.70 | 1.005 | 31.77 | 1.140 | 44.29 |
| 1.035 | 10.35 | 1.075 | 22.25 | 1.110 | 33.45 | 1.144 | 44.90 |
| 1.040 | 11.86 | | | | | | |

## COMPARISON OF THE SCALES OF FAHRENHEIT'S, CENTIGRADE, AND RÉAUMUR'S THERMOMETERS.

| Fahrenheit. | Centigrade. | Réaumur. | Fahrenheit. | Centigrade. | Réaumur. |
|---|---|---|---|---|---|
| 212° | 100° | 80° | 187.25° | 86.25° | 69° |
| 211 | 99.4 | 79.5 | 187 | 86.1 | 68.8 |
| 210.2 | 99 | 79.2 | 186.8 | 86 | 68 8 |
| 210 | 98.8 | 79.1 | 186 | 85.5 | 68.4 |
| 209.75 | 98.75 | 79 | 185 | 85 | 68 |
| 209 | 98.3 | 78.6 | 184 | 84.4 | 67.5 |
| 208.4 | 98 | 78.4 | 183.2 | 84 | 67.2 |
| 208 | 97.7 | 78.2 | 183 | 83.8 | 67.1 |
| 207.5 | 97.5 | 78 | 182.75 | 83.75 | 67 |
| 207 | 97.2 | 77.7 | 182 | 83.3 | 66.6 |
| 206.6 | 97 | 77.6 | 181.4 | 83 | 66.4 |
| 206 | 96.6 | 77.3 | 181 | 82.7 | 66.2 |
| 205.25 | 96.25 | 77 | 180.5 | 82.5 | 66 |
| 205 | 96.1 | 76.8 | 180 | 82.2 | 65.7 |
| 204.8 | 96 | 76.8 | 179.6 | 82 | 65.6 |
| 204 | 95.5 | 76.4 | 179 | 81.6 | 65.3 |
| 203 | 95 | 76 | 178.25 | 81.25 | 65 |
| 202 | 94.4 | 75.5 | 178 | 81.1 | 64.8 |
| 201.2 | 94 | 75.2 | 177.8 | 81 | 64.8 |
| 201 | 93.8 | 75.1 | 177 | 80.5 | 64.4 |
| 200.75 | 93.75 | 75 | 176 | 80 | 64 |
| 200 | 93.3 | 74.6 | 175 | 79.4 | 63.5 |
| 199.4 | 93 | 74.4 | 174.2 | 79 | 63.2 |
| 199 | 92.7 | 74.2 | 174 | 78.8 | 63.1 |
| 198.5 | 92.5 | 74 | 173.75 | 78.75 | 63 |
| 198 | 92.2 | 73.7 | 173 | 78.3 | 62.6 |
| 197.6 | 92 | 73.6 | 172.4 | 78 | 62.4 |
| 197 | 91.6 | 73.3 | 172 | 77.7 | 62.2 |
| 196.25 | 91.25 | 73 | 171.5 | 77.5 | 62 |
| 196 | 91.1 | 72.8 | 171 | 77.2 | 61.7 |
| 195.8 | 91 | 72.8 | 170.6 | 77 | 61.6 |
| 195 | 90.5 | 72.4 | 170 | 76.6 | 61.3 |
| 194 | 90 | 72 | 169.25 | 76.25 | 61 |
| 193 | 89.4 | 71.5 | 169 | 76.1 | 60.8 |
| 192.2 | 89 | 71.2 | 168.8 | 76 | 60.8 |
| 192 | 88.8 | 71.1 | 168 | 75.5 | 60.4 |
| 191.75 | 88.75 | 71 | 167 | 75 | 60 |
| 191 | 88.3 | 70.6 | 166 | 74.4 | 59.5 |
| 190.4 | 88 | 70.4 | 165.2 | 74 | 59.2 |
| 190 | 87.7 | 70.2 | 165 | 73.8 | 59.1 |
| 189.5 | 87.5 | 70 | 164.75 | 73.75 | 59 |
| 189 | 87.2 | 69.7 | 164 | 73 3 | 58.6 |
| 188.6 | 87 | 69.6 | 163.4 | 73 | 58.4 |
| 188 | 86.6 | 69.3 | 163 | 72.7 | 58.2 |

COMPARISON OF THERMOMETER SCALES—*Continued.*

| Fahrenheit. | Centigrade. | Réaumur. | Fahrenheit. | Centigrade. | Réaumur. |
|---|---|---|---|---|---|
| 162°.5 | 72°.5 | 58° | 137° | 58°.3 | 46°.6 |
| 162 | 72.2 | 57.7 | 136.4 | 58 | 47.4 |
| 161.6 | 72 | 57.6 | 136 | 57.7 | 46.2 |
| 161 | 71.6 | 57.3 | 135.5 | 57.5 | 46 |
| 160.25 | 71.25 | 57 | 135 | 57.2 | 45.7 |
| 160 | 71.1 | 56.8 | 134.6 | 57 | 45.6 |
| 159.8 | 71 | 56.8 | 134 | 56.6 | 45.3 |
| 159 | 70.5 | 56.4 | 133.25 | 56.25 | 45 |
| 158 | 70 | 56 | 133 | 56.1 | 44.8 |
| 157 | 69.4 | 55.5 | 132.8 | 56 | 44.8 |
| 156.2 | 69 | 55.2 | 132 | 55.5 | 44.4 |
| 156 | 68.8 | 55.1 | 131 | 55 | 44 |
| 155.75 | 68.75 | 55 | 130 | 54.4 | 43.5 |
| 155 | 68.3 | 54.6 | 129.2 | 54 | 43.2 |
| 154.4 | 68 | 54.4 | 129 | 53.8 | 43.1 |
| 154 | 67.7 | 54.2 | 128.75 | 53.75 | 43 |
| 153.5 | 67.5 | 54 | 128 | 53.3 | 42.6 |
| 153 | 67.2 | 53.7 | 127.4 | 53 | 42.4 |
| 152.6 | 67 | 53.6 | 127 | 52.7 | 42.2 |
| 152 | 66.6 | 53.3 | 126.5 | 52.5 | 42 |
| 151.25 | 66.25 | 53 | 126 | 52.2 | 41.7 |
| 151 | 66.1 | 52.8 | 125.6 | 52 | 41.6 |
| 150.8 | 66 | 52.8 | 125 | 51.6 | 41.3 |
| 150 | 65.5 | 52.4 | 124.25 | 51.25 | 41 |
| 149 | 65 | 52 | 124 | 51.1 | 40.8 |
| 148 | 64.4 | 51.5 | 123.8 | 51 | 40.8 |
| 147.2 | 64 | 51.2 | 123 | 50.5 | 40.4 |
| 147 | 63.8 | 51.1 | 122 | 50 | 40 |
| 146.75 | 63.75 | 51 | 121 | 49.4 | 39.5 |
| 146 | 63.3 | 50.6 | 120.2 | 49 | 39.2 |
| 145.4 | 63 | 50.4 | 120 | 48.8 | 39.1 |
| 145 | 62.7 | 50.2 | 119.75 | 48.75 | 39 |
| 144.5 | 62.5 | 60 | 119 | 48.3 | 38.6 |
| 144 | 62.2 | 69.7 | 118.4 | 48 | 38.4 |
| 143.6 | 62 | 49.6 | 118 | 47.7 | 38.2 |
| 143 | 61.6 | 49.3 | 117.5 | 47.5 | 38 |
| 142.25 | 61.25 | 46 | 117 | 47.2 | 37.7 |
| 142 | 61.1 | 48.8 | 116.6 | 47 | 37.6 |
| 141.8 | 61 | 48.8 | 116 | 46.6 | 37.3 |
| 141 | 60.5 | 48.4 | 115.25 | 46.25 | 37 |
| 140 | 60 | 48 | 115 | 46.1 | 36.8 |
| 139 | 59.4 | 47.5 | 114.8 | 46 | 36.8 |
| 138.2 | 59 | 47.2 | 114 | 45.5 | 36.4 |
| 138 | 58.8 | 47.1 | 113 | 45 | 36 |
| 137.75 | 58.75 | 47 | 112 | 44.4 | 35.5 |

COMPARISON OF THERMOMETER SCALES—*Continued.*

| Fahrenheit. | Centigrade. | Réaumur. | Fahrenheit. | Centigrade. | Réaumur. |
|---|---|---|---|---|---|
| ° | ° | ° | ° | ° | ° |
| 111.2 | 44 | 35.2 | 87 | 30.5 | 24.4 |
| 111 | 43.8 | 35.1 | 86 | 30 | 24 |
| 110.75 | 43.75 | 35 | 85 | 29.4 | 23.5 |
| 110 | 43.3 | 34.6 | 84.2 | 29 | 23.2 |
| 109.4 | 43 | 34.4 | 84 | 28.8 | 23.1 |
| 109 | 42.7 | 34.2 | 83.75 | 28.75 | 23 |
| 108.5 | 42.5 | 34 | 83 | 28.3 | 22.6 |
| 108 | 42.2 | 33.7 | 82.4 | 28 | 22.4 |
| 107.6 | 42 | 33.6 | 82 | 27.7 | 22.2 |
| 107 | 41.6 | 33.3 | 81.5 | 27.5 | 22 |
| 106.25 | 41.25 | 33 | 81 | 27.2 | 21.7 |
| 106 | 41.1 | 32.8 | 80.6 | 27 | 21.6 |
| 105.8 | 41 | 32.8 | 80 | 26.6 | 21.3 |
| 105 | 40.5 | 32.4 | 79.25 | 26.25 | 21 |
| 104 | 40 | 32 | 79 | 26.1 | 20.8 |
| 103 | 39.4 | 31.5 | 78.8 | 26 | 20.8 |
| 102.2 | 39 | 31.2 | 78 | 25.5 | 20.4 |
| 102 | 38.8 | 31.1 | 77 | 25 | 20 |
| 101.75 | 38.75 | 31 | 76 | 24.4 | 19.5 |
| 101 | 38.3 | 30.6 | 75.2 | 24 | 19.2 |
| 100.4 | 38 | 30.4 | 75 | 23.8 | 19.1 |
| 100 | 37.7 | 30.2 | 74.75 | 23.75 | 19 |
| 99.5 | 37.5 | 30 | 74 | 23.3 | 18.6 |
| 99 | 37.2 | 29.7 | 73.4 | 23 | 18.4 |
| 98.6 | 37 | 29.6 | 73 | 22.7 | 18.2 |
| 98 | 36.6 | 29.3 | 72.5 | 22.5 | 18 |
| 97.25 | 36.25 | 29 | 72 | 22.2 | 17.7 |
| 97 | 36.1 | 28.8 | 71.6 | 22 | 17.6 |
| 96.8 | 36 | 28.8 | 71 | 21.6 | 17.3 |
| 96 | 35.5 | 28.4 | 70.25 | 21.25 | 17 |
| 95 | 35 | 28 | 70 | 21.1 | 16.8 |
| 94 | 34.4 | 27.5 | 69.8 | 21 | 16.8 |
| 93.2 | 34 | 27.2 | 69 | 20.5 | 16.4 |
| 93 | 33.8 | 27.1 | 68 | 20 | 16 |
| 92.75 | 33.75 | 27 | 67 | 19.4 | 15.5 |
| 92 | 33.3 | 26.6 | 66.2 | 19 | 15.2 |
| 91.4 | 33 | 26.4 | 66 | 18.8 | 15.1 |
| 91 | 32.7 | 26.2 | 65.75 | 18.75 | 15 |
| 90.5 | 32.5 | 26 | 65 | 18.3 | 14.6 |
| 90 | 32.2 | 25.7 | 64.4 | 18 | 14.4 |
| 89.6 | 32 | 25.6 | 64 | 17.7 | 14.2 |
| 89 | 31.6 | 25.3 | 63.5 | 17.5 | 14 |
| 88.25 | 31.25 | 25 | 63 | 17.2 | 13.7 |
| 88 | 31.1 | 24.8 | 62.6 | 17 | 13.6 |
| 87.8 | 31 | 24.8 | 62 | 16.6 | 13.3 |

COMPARISON OF THERMOMETER SCALES—*Continued.*

| Fahrenheit. | Centigrade. | Réaumur. | Fahrenheit. | Centigrade. | Réaumur. |
|---|---|---|---|---|---|
| 61.25° | 16.25° | 13° | 36° | 2.2° | 1.7° |
| 61 | 16.1 | 12.8 | 35.6 | 2 | 1.6 |
| 60.8 | 16 | 12.8 | 35 | 1.6 | 1.3 |
| 60 | 15.5 | 12.4 | 34.25 | 1.25 | 1 |
| 59 | 15 | 12 | 34 | 1.1 | 0.8 |
| 58 | 14.4 | 11.5 | 33.8 | 1 | 0.8 |
| 57.2 | 14 | 11.2 | 33 | 0.5 | 0.4 |
| 57 | 13.8 | 11.1 | 32 | 0 | 0 |
| 56.75 | 13.75 | 11 | 31 | —0.5 | —0.4 |
| 56 | 13.3 | 10.6 | 30.2 | —1 | —0.8 |
| 55.4 | 13 | 10.4 | 30 | —1.1 | —0.8 |
| 55 | 12.7 | 10.2 | 29.75 | —1.25 | —1 |
| 54.5 | 12.5 | 10 | 29 | —1.6 | —1.3 |
| 54 | 12.2 | 9.7 | 28.4 | —2 | —1.6 |
| 53.6 | 12 | 9.6 | 28 | —2.2 | —1.7 |
| 53 | 11.6 | 9.3 | 27.5 | —2.5 | —2 |
| 52.25 | 11.25 | 9 | 27 | —2.7 | —2.2 |
| 52 | 11.1 | 8.8 | 26.6 | —3 | —2.4 |
| 51.8 | 11 | 8.8 | 26 | —3.3 | —2.6 |
| 51 | 10.5 | 8.4 | 25.25 | —3.75 | —3 |
| 50 | 10 | 8 | 25 | —3.8 | —3.1 |
| 49 | 9.4 | 7.5 | 24.8 | —4 | —3.2 |
| 48.2 | 9 | 7.2 | 24 | —4.4 | —3.5 |
| 48 | 8.8 | 7.1 | 23 | —5 | —4 |
| 47.75 | 8.75 | 7 | 22 | —5.5 | —4.4 |
| 47 | 8.3 | 6.6 | 21.2 | —6 | —4.8 |
| 46.4 | 8 | 6.4 | 21 | —6.1 | —4.8 |
| 46 | 7.7 | 6.2 | 20.75 | —6 | —5 |
| 45.5 | 7.5 | 6 | 20 | —6.6 | —5.3 |
| 45 | 7.2 | 5.7 | 19.4 | —7.4 | —5.6 |
| 44.6 | 7 | 5.6 | 19 | —7.2 | —5.7 |
| 44 | 6.6 | 5.3 | 18.5 | —7.5 | —6 |
| 43.25 | 6.25 | 5 | 18 | —7.7 | —6.2 |
| 43 | 6.1 | 4.8 | 17.6 | —8 | —6.4 |
| 42.8 | 6 | 4.8 | 17 | —8.3 | —6.6 |
| 42 | 5.5 | 4.4 | 16.25 | —8.75 | —7 |
| 41 | 5 | 4 | 16 | —8.8 | —7.1 |
| 40 | 4.4 | 3.5 | 15.8 | —9 | —7.2 |
| 39.2 | 4 | 3.2 | 15 | —9.4 | —7.5 |
| 39 | 3.8 | 3.1 | 14 | —10 | —8 |
| 38.75 | 3.75 | 3 | 13 | —10.5 | —8.4 |
| 38 | 3.3 | 2.6 | 12.2 | —11 | —8.8 |
| 37.4 | 3 | 2.4 | 12 | —11.1 | —8.8 |
| 37 | 2.7 | 2.2 | 11.75 | —11.25 | —9 |
| 36.5 | 2.5 | 2 | 11 | —11.6 | —9.3 |

COMPARISON OF THERMOMETER SCALES—*Continued.*

| Fahrenheit. | Centigrade. | Réaumur. | Fahrenheit. | Centigrade. | Réaumur. |
|---|---|---|---|---|---|
| 10°.4 | —12° | —9°.6 | —10° | —23°.3 | —18°.6 |
| 10 | —12.2 | —9.7 | —10.75 | —23.75 | —19 |
| 9.5 | —12.5 | —10 | —11 | —23.8 | —19.1 |
| 9 | —12.7 | —10.2 | —11.2 | —24 | —19.2 |
| 8.6 | —13 | —10.4 | —12 | —24.4 | —19.5 |
| 8 | —13.3 | —10.6 | —13 | —25 | —20 |
| 7.25 | —13 75 | —11 | —14 | —25.5 | —20.4 |
| 7 | —13.8 | —11.1 | —14.8 | —26 | —20.8 |
| 6.8 | —14 | —11.2 | —15 | —26.1 | —20.3 |
| 6 | —14.4 | —11.5 | —15.25 | —26.25 | —21 |
| 5 | —15 | —12 | —16 | —26.6 | —21.3 |
| 4 | —15.5 | —12.4 | —16.6 | —27 | —21.6 |
| 3.2 | —16 | —12.8 | —17 | —27.2 | —21.7 |
| 3 | —16.1 | —12.8 | —17.5 | —27.5 | —22 |
| 2.75 | —16.25 | —13 | —18 | —27.7 | —22.2 |
| 2 | —16.6 | —13.3 | —18.4 | —28 | —22.4 |
| 1.4 | —17 | —13.6 | —19 | —28.3 | —22.6 |
| 1 | —17.2 | —13.7 | —19.75 | —28.75 | —23 |
| 0.5 | —17.5 | —14 | —20 | —28.8 | —23.1 |
| 0 | —17.7 | —14.2 | —20.2 | —29 | —23.2 |
| —0.4 | —18 | —14.4 | —21 | —29.4 | —23.5 |
| —1 | —18.3 | —14.6 | —22 | —30 | —24 |
| —1.75 | —18.75 | —15 | —23 | —30.5 | —24.4 |
| —2 | —18.8 | —15.1 | —23.8 | —31 | —24.8 |
| —2.2 | —19 | —15.2 | —24 | —31.1 | —21.8 |
| —3 | —19.4 | —15.5 | —24.25 | —31.25 | —25 |
| —4 | —20 | —16 | —25 | —31.6 | —25.3 |
| —5 | —20.5 | —16.4 | —25.6 | —32 | —25.6 |
| —5.8 | —21 | —16.8 | —26 | —32.2 | —25.7 |
| —6 | —21.1 | —16.8 | —26.5 | —32.5 | —26 |
| —6.25 | —21.25 | —17 | —27 | —32.7 | —26.2 |
| —7 | —21.6 | —17.3 | —27.4 | —33 | —26.4 |
| —7.6 | —22 | —17.6 | —28 | —33.3 | —26.6 |
| —8 | —22.2 | —17.7 | —28.75 | —33.75 | —27 |
| —8.5 | —22.5 | —18 | —29 | —33.8 | —27.1 |
| —9 | —22.7 | —18.2 | —29.2 | —34 | —27.2 |
| —9.4 | —23 | —18.4 | —30 | —34.4 | —27.5 |

## WEIGHT OF ONE CUBIC CENTIMETRE OF ATMOSPHERIC AIR, IN GRAMS, AT DIFFERENT TEMPERATURES, FOR EVERY 5 DEGREES FROM 0 TO 300° C. AT 760 MM. (EVERY 9 DEGREES FROM 32 TO 572° F.)

| Degrees Cent. | Degrees Fahr. | Gram. | Diff. | Degrees Cent. | Degrees Fahr. | Gram. | Diff |
|---|---|---|---|---|---|---|---|
| 0 | 32 | 0.001293 | | 155 | 311 | 0.000824 | 10 |
| 5 | 41 | 0.001270 | 23 | 160 | 320 | 0.000815 | 9 |
| 10 | 50 | 0.001248 | 22 | 165 | 329 | 0.000806 | 9 |
| 15 | 59 | 0.001226 | 22 | 170 | 338 | 0.000797 | 9 |
| 20 | 68 | 0.001205 | 21 | 175 | 347 | 0.000788 | 9 |
| 25 | 77 | 0.001185 | 20 | 180 | 356 | 0.000779 | 9 |
| 30 | 86 | 0.001165 | 20 | 185 | 365 | 0.000770 | 9 |
| 35 | 95 | 0.001146 | 19 | 190 | 374 | 0.000762 | 8 |
| 40 | 104 | 0.001128 | 18 | 195 | 383 | 0 060754 | 8 |
| 45 | 113 | 0.001111 | 17 | 200 | 392 | 0.000746 | 8 |
| 50 | 122 | 0.001094 | 17 | 205 | 401 | 0.000738 | 8 |
| 55 | 131 | 0.001077 | 17 | 210 | 410 | 0.000730 | 8 |
| 60 | 140 | 0.001060 | 17 | 215 | 419 | 0.000722 | 8 |
| 65 | 149 | 0.001044 | 16 | 220 | 428 | 0.000715 | 7 |
| 70 | 158 | 0.001029 | 15 | 225 | 437 | 0.000708 | 7 |
| 75 | 167 | 0 001014 | 15 | 230 | 446 | 0 000701 | 7 |
| 80 | 176 | 0.001000 | 14 | 235 | 455 | 0.000694 | 7 |
| 85 | 185 | 0.000986 | 14 | 240 | 464 | 0.000687 | 7 |
| 90 | 194 | 0.000972 | 14 | 245 | 473 | 0.000680 | 7 |
| 95 | 203 | 0.000959 | 13 | 250 | 482 | 0.000674 | 6 |
| 100 | 212 | 0.000946 | 13 | 255 | 491 | 0.000668 | 6 |
| 105 | 221 | 0.000933 | 13 | 260 | 500 | 0.000662 | 6 |
| 110 | 230 | 0 000921 | 12 | 265 | 509 | 0.000656 | 6 |
| 115 | 239 | 0.000909 | 12 | 270 | 518 | 0.000650 | 6 |
| 120 | 248 | 0.000898 | 11 | 275 | 527 | 0.000644 | 6 |
| 125 | 257 | 0.000887 | 11 | 280 | 536 | 0.000638 | 6 |
| 130 | 266 | 0.000876 | 11 | 285 | 545 | 0.000632 | 6 |
| 135 | 275 | 0.000865 | 11 | 290 | 554 | 0.000626 | 6 |
| 140 | 284 | 0.000854 | 11 | 295 | 563 | 0.000621 | 5 |
| 145 | 293 | 0.000844 | 10 | 300 | 572 | 0.000616 | 5 |
| 150 | 302 | 0.000834 | 10 | | | | |

The column of Differences is intended to facilitate the calculation of the intermediate values. Thus to find the weight of 1 cub. cent. of air for 52°, we must add to the weight for 50° two fifths of the difference (17) between this and the number for 55°: thus

Weight of 1 cub. cent. of air at 50° = 0.001094
Add $\frac{2}{5}$ of 17 = 7

Weight of 1 cub. cent. of air at 55° = 0.01101

## TABLE OF CORRESPONDING HEIGHTS OF THE BAROMETER IN MILLIMETRES.

| Mm. | Inches. | Mm. | Inches. | Mm. | Inches. | Mm. | Inches. |
|---|---|---|---|---|---|---|---|
| 700 | 27.56 | 723 | 28.47 | 746 | 29.37 | 768 | 30.24 |
| 701 | 27.59 | 724 | 28.50 | 747 | 29.41 | 769 | 30.28 |
| 702 | 27.64 | 725 | 28.54 | 748 | 29.45 | 760 | 30.32 |
| 703 | 27.68 | 726 | 28.58 | 749 | 29.49 | 771 | 30.36 |
| 704 | 27.72 | 727 | 28.62 | 750 | 29.53 | 772 | 30.38 |
| 705 | 27.76 | 728 | 28.66 | 751 | 29.57 | 773 | 30.43 |
| 706 | 27.80 | 729 | 28.70 | 752 | 29.61 | 774 | 30.47 |
| 707 | 27.84 | 730 | 28.74 | 753 | 29.65 | 775 | 30.51 |
| 708 | 27.88 | 731 | 28.78 | 754 | 29.69 | 776 | 30.55 |
| 709 | 27.91 | 732 | 28.82 | 755 | 29.73 | 777 | 30.59 |
| 710 | 27.95 | 733 | 28.86 | 756 | 29.76 | 778 | 30.63 |
| 711 | 27.99 | 734 | 28.90 | 757 | 29.80 | 779 | 30.67 |
| 712 | 28.03 | 735 | 28.94 | 758 | 29.84 | 780 | 30.71 |
| 713 | 28.07 | 736 | 28.98 | 759 | 29.88 | 781 | 30.75 |
| 714 | 28.11 | 737 | 29.02 | 760 | 29.92 | 782 | 30.79 |
| 715 | 28.15 | 738 | 29.06 | 761 | 29.96 | 783 | 30.83 |
| 716 | 28.19 | 739 | 29.10 | 762 | 30.00 | 784 | 30.87 |
| 717 | 28.23 | 740 | 29.13 | 763 | 30.04 | 785 | 30.91 |
| 718 | 28.27 | 741 | 29.17 | 764 | 30.08 | 786 | 30.95 |
| 719 | 28.31 | 742 | 29.21 | 765 | 30.12 | 787 | 30.99 |
| 720 | 28.35 | 743 | 29.25 | 766 | 30.16 | 788 | 31.02 |
| 721 | 28.38 | 744 | 29.29 | 767 | 30.20 | 789 | 31.06 |
| 722 | 28.43 | 745 | 29.33 | | | | |

## COMPARISON OF THE DEGREES OF THE MERCURIAL-THERMOMETER WITH THOSE OF THE AIR-THERMOMETER.

| Mercurial. | Air. | Mercurial. | Air. | Mercurial. | Air. |
|---|---|---|---|---|---|
| 100 | 100.00 | 200 | 197.49 | 300 | 294.51 |
| 150 | 148.74 | 250 | 245.39 | 350 | 320.92 |

## CONVERSION OF COLUMN OF WATER TO COLUMN OF MERCURY AT THE TEMPERATURE OF 15°C.

| Water. | Mercury. | Water. | Mercury. | Water. | Mercury. |
|---|---|---|---|---|---|
| 1 | .0737 | 4 | .2948 | 7 | .5158 |
| 2 | .1474 | 5 | .3685 | 8 | .5895 |
| 3 | .2211 | 6 | .4421 | 9 | .6632 |

## VOLUME AND DENSITY OF WATER FOR VARYING TEMPERATURES.

| Cent. | Volume at 4° = 1. | True density or grains in 1 c.c. | Cent. | Volume at 4° = 1. | True density or grains in 1 c.c. |
|---|---|---|---|---|---|
| −10 | 1.001858 | .998145 | 14 | 1.000701 | .999299 |
| − 9 | 1.001375 | .998427 | 15 | 1.000841 | .999160 |
| − 8 | 1.001317 | .998685 | 16 | 1.000999 | .999002 |
| − 7 | 1.001089 | .998911 | 17 | 1.001160 | .998841 |
| − 6 | 1.000883 | .999118 | 18 | 1.001348 | .998654 |
| − 5 | 1.000702 | .999298 | 19 | 1.001542 | .998460 |
| − 4 | 1.000545 | .999455 | 20 | 1.001744 | .998259 |
| − 3 | 1.000410 | .999590 | 21 | 1.001957 | .998047 |
| − 2 | 1.000297 | .999703 | 22 | 1.002177 | .997826 |
| − 1 | 1.000203 | .999797 | 23 | 1.002405 | .997601 |
| 0 | 1.000129 | .999871 | 24 | 1.002641 | .997367 |
| 1 | 1.000072 | .999928 | 25 | 1.002888 | .997120 |
| 2 | 1.000031 | .999969 | 26 | 1.003144 | .996866 |
| 3 | 1.000009 | .999991 | 27 | 1.003408 | .996603 |
| 4 | 1.000000 | 1.000000 | 28 | 1.003682 | .996331 |
| 5 | 1.000010 | .999990 | 29 | 1.003965 | .996051 |
| 6 | 1.000030 | .999970 | 30 | 1.004253 | .995765 |
| 7 | 1.000067 | .999933 | 40 | 1.004253 | .995235 |
| 8 | 1.000114 | .999886 | 50 | 1.007695 | .998820 |
| 9 | 1.000176 | .999824 | 60 | 1.011941 | .998338 |
| 10 | 1.000253 | .999747 | 70 | 1.016919 | .997794 |
| 11 | 1.000345 | .999655 | 80 | 1.022555 | .997194 |
| 12 | 1 000451 | .999549 | 90 | 1.035675 | .996556 |
| 13 | 1.000570 | .999430 | 100 | 1.043130 | 0.95865 |

## TENSION OF MERCURY-VAPORS.

| Centigrade. | Millimetres. | Centigrade. | Millimetres. | Centigrade. | Millimetres. |
|---|---|---|---|---|---|
| 100 | .75 | 180 | 11.09 | 260 | 96.73 |
| 110 | 1.07 | 190 | 14.84 | 270 | 123.01 |
| 120 | 1.53 | 200 | 19.90 | 280 | 155.17 |
| 130 | 2.18 | 210 | 26.35 | 290 | 194.46 |
| 140 | 3.06 | 220 | 34.70 | 300 | 242.15 |
| 150 | 4.27 | 230 | 45.35 | 310 | 299.69 |
| 160 | 5.90 | 240 | 58.82 | 320 | 368.73 |
| 170 | 8.09 | 250 | 75.75 | 330 | 450.91 |

## VOLUME AND DENSITY OF MERCURY.

| | Volume of mercury at 0°C = 1. | Density or grains in 1 c.c. | | Volume of mercury at 0°C = 1. | Density or grains in 1 c.c. |
|---|---|---|---|---|---|
| 0 | 1.000000 | 13.596 | 40 | 1.007201 | 13.498 |
| 4 | 1.000716 | 13.586 | 50 | 1.009013 | 13.474 |
| 5 | 1.000896 | 13.584 | 60 | 1.010831 | 13.450 |
| 10 | 1.001792 | 13.572 | 70 | 1.012655 | 13.426 |
| 15 | 1.002691 | 13.559 | 80 | 1.014482 | 13.401 |
| 20 | 1.003590 | 13.547 | 90 | 1.016315 | 13.377 |
| 30 | 1.005393 | 13.523 | 100 | 1.018153 | 13.353 |

## CONVERSION OF PRESSURE IN ATMOSPHERES.

| | Millimetres of mercury. | Inches of mercury. | Pounds on square inch. | Feet of water. |
|---|---|---|---|---|
| 1 | 760 | 29.922 | 14.7 | 33 9 |
| 2 | 1520 | 58.844 | 29.4 | 67.8 |
| 3 | 2280 | 89.765 | 44.1 | 101.7 |
| 4 | 3040 | 119.687 | 58.8 | 135.6 |
| 5 | 3800 | 149.609 | 73.5 | 169.5 |
| 6 | 4560 | 179.531 | 88.2 | 203.4 |
| 7 | 5320 | 209.453 | 102.9 | 237.3 |
| 8 | 6080 | 239.374 | 117.6 | 271.2 |
| 9 | 6840 | 269.296 | 132.3 | 305.1 |

## CONVERTING GRAINS INTO GRAMS.

| Grains. | Grams. | Grains. | Grams. | Grains. | Grams. |
|---|---|---|---|---|---|
| $\frac{1}{100}$ | .00065 | $\frac{1}{16}$ | .00405 | 3 | .195 |
| $\frac{1}{64}$ | .00101 | $\frac{1}{15}$ | .00432 | 4 | .260 |
| $\frac{1}{60}$ | .00108 | $\frac{1}{12}$ | .00540 | 5 | .325 |
| $\frac{1}{50}$ | .00130 | $\frac{1}{10}$ | .00648 | 6 | .390 |
| $\frac{1}{48}$ | .00135 | $\frac{1}{8}$ | .00810 | 7 | .455 |
| $\frac{1}{40}$ | .00162 | $\frac{1}{6}$ | .01080 | 8 | .520 |
| $\frac{1}{36}$ | .00180 | $\frac{1}{5}$ | .01296 | 9 | .585 |
| $\frac{1}{32}$ | .00202 | $\frac{1}{4}$ | .01620 | 10 | .650 |
| $\frac{1}{30}$ | .00216 | $\frac{1}{3}$ | .02160 | 11 | .715 |
| $\frac{1}{25}$ | .00259 | $\frac{1}{2}$ | .03240 | 12 | .780 |
| $\frac{1}{24}$ | .00270 | $\frac{3}{4}$ | .04860 | 13 | .845 |
| $\frac{1}{20}$ | .00324 | 1 | .065 | 14 | .910 |
| $\frac{1}{18}$ | .00360 | 2 | .130 | 15 | .975 |

## CONVERTING GRAMS INTO GRAINS, ETC.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | gram | = | $15\frac{2}{5}$ | grains. | | | | | |
| 2 | grams | = | $30\frac{4}{5}$ | " | | | | | |
| 3 | " | = | $46\frac{1}{5}$ | " | | | | | |
| 4 | " | = | $61\frac{3}{5}$ | " | or | 1 | drachm | $1\frac{3}{5}$ | grain. |
| 5 | " | = | 77 | " | | 1 | " | 17 | grains. |
| 6 | " | = | $92\frac{2}{5}$ | " | | 1 | " | $32\frac{2}{5}$ | " |
| 7 | " | = | $107\frac{4}{5}$ | " | | 1 | " | $47\frac{4}{5}$ | " |
| 8 | " | = | $123\frac{1}{5}$ | " | | 2 | drachms | $3\frac{1}{5}$ | " |
| 9 | " | = | $138\frac{3}{5}$ | " | | 2 | " | $18\frac{3}{5}$ | " |
| 10 | " | = | 154 | " | | 2 | " | 34 | " |
| 11 | " | = | $169\frac{2}{5}$ | " | | 2 | " | $49\frac{2}{5}$ | " |
| 12 | " | = | $184\frac{4}{5}$ | " | | 3 | " | $4\frac{4}{5}$ | " |
| 13 | " | = | $200\frac{1}{5}$ | " | | 3 | " | $20\frac{1}{5}$ | " |
| 14 | " | = | $215\frac{3}{5}$ | " | | 3 | " | $35\frac{3}{5}$ | " |
| 15 | " | = | 231 | " | | 3 | " | 51 | " |
| 16 | " | = | $246\frac{2}{5}$ | " | | 4 | " | $6\frac{2}{5}$ | " |
| 17 | " | = | $261\frac{4}{5}$ | " | | 4 | " | $21\frac{4}{5}$ | " |
| 18 | " | = | $277\frac{1}{5}$ | " | | 4 | " | $37\frac{1}{5}$ | " |
| 19 | " | = | $292\frac{3}{5}$ | " | | 4 | " | $52\frac{3}{5}$ | " |
| 20 | " | = | 308 | " | | 5 | " | 8 | " |
| 30 | " | = | 462 | " | | 7 | " | 42 | " |
| 40 | " | = | 616 | " | | 10 | " | 16 | " |
| 50 | " | = | 770 | " | | 12 | " | 50 | " |
| 60 | " | = | 924 | " | | 15 | " | 24 | " |
| 70 | " | = | 1078 | " | | 17 | " | 58 | " |
| 80 | " | = | 1232 | " | | 20 | " | 32 | " |
| 90 | " | = | 1386 | " | | 23 | " | 6 | " |
| 100 | " | = | 1540 | " | | 25 | " | 40 | " |

## CONVERTING CUBIC CENTIMETRES INTO MINIMS, ETC.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | cubic centimetre | = | 17 | minims (as near as possible). | | | | | | | |
| 2 | cubic centimetres | = | 34 | " | | | | | | | |
| 3 | " | = | 51 | " | | | | | | | |
| 4 | " | = | 68 | " | or | 1 | drachm | 8 | minims. | | |
| 5 | " | = | 85 | " | | 1 | " | 25 | " | | |
| 6 | " | = | 102 | " | | 1 | " | 42 | " | | |
| 7 | " | = | 119 | " | | 1 | " | 59 | " | | |
| 8 | " | = | 136 | " | | 2 | drachms | 16 | " | | |
| 9 | " | = | 153 | " | | 2 | " | 33 | " | | |
| 10 | " | = | 170 | " | | 2 | " | 50 | " | | |
| 20 | " | = | 340 | " | | 5 | " | 40 | " | | |
| 30 | " | = | 510 | " | | 1 | ounce | 0 | drachm | 30 | mins. |
| 40 | " | = | 680 | " | | 1 | " | 3 | drachms | 20 | " |
| 50 | " | = | 850 | " | | 1 | " | 6 | " | 10 | " |
| 60 | " | = | 1020 | " | | 2 | ounces | 1 | " | 0 | " |
| 70 | " | = | 1190 | " | | 2 | " | 3 | " | 50 | " |
| 80 | " | = | 1360 | " | | 2 | " | 6 | " | 40 | " |
| 90 | " | = | 1530 | " | | 3 | " | 1 | " | 30 | " |
| 100 | " | = | 1700 | " | | 3 | " | 4 | " | 20 | " |

## TABLES OF WEIGHTS AND MEASURES.

### APOTHECARIES' WEIGHT.

*Fluid.*

60 minims = 1 fluid drachm.
8 drachms = 1 ounce.
20 ounces = 1 pint.

*Solid Measure.*

20 grains = 1 scruple = 20 grains.
3 scruples = 1 drachm = 60 "
8 drachms = 1 ounce = 480 "
12 ounces = 1 pound.

### AVOIRDUPOIS WEIGHT.

27⅛ grains = 1 drachm = 27⅛ grains.
16 drachm = 1 ounce = 437½ "
16 ounces = 1 pound = 7000. "

### VALUE OF AVOIRDUPOIS WEIGHTS AND IMPERIAL MEASURE IN METRICAL WEIGHTS AND MEASURES.

| Avoirdupois Weight. | | Metrical Weights. |
|---|---|---|
| 1 pound | = | 453.5925 grams. |
| 1 ounce | = | 28.3495 " |
| 1 grain | = | .0648 gram. |

| Imperial Measure. | | Metrical Measure. |
|---|---|---|
| 1 gallon | = | 4.53487 litres. |
| 1 pint | = | .567636 litre. |
| 1 fluid-ounce | = | .028396 " |
| 1 fluid-drachm | = | .003549 " |
| 1 minim | = | .000059 " |

### MEASURES OF LENGTH.

1 millimetre = .0394 inch.
1 kilometre = .6214 mile.
1 inch = 25.4 millimetres.
1 foot = .3048 metre.
1 yard = .9144 "
1 mile = 1.609 kilometres.
1 knot = 1.855 "

The metre unit of length at 32° = 39.370432 inches.
The litre unit of capacity = 33.816 fluid ounces.
The gram unit of weight = 15.43234874 Troy grains.

## THE APPROXIMATE COMPOSITION OF DIFFERENT ALLOYS.

| ALLOY. | PER CENT. | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Zn. | Cu. | Pb. | Ni. | Sb. | Sn. | Bi. | Cd. |
| Brass | 25 | 75 | when present 1 to 2 | | | | | |
| German silver | 34 | 33 | ...... | 33 | | | | |
| Type-metal | ...... | ..... | 80 | ...... | 20 | | | |
| Speculum | ...... | 80 | ...... | ...... | ...... | 20 | | |
| Wood's metal | ...... | ...... | 25 | ...... | ...... | 12.5 | 50 | 12.5 |

## RELATIVE VALUE OF U. S. AND METRICAL MEASURES OF LENGTH.

| Inches. | Centimetres. | Inches. | Millimetres. |
|---|---|---|---|
| 12 | 30.40 | $\frac{1}{25}$ | 1.00 |
| 11 | 27.94 | $\frac{1}{12}$ | 2.11 |
| 10 | 25.40 | $\frac{1}{8}$ | 3.17 |
| 9 | 22.86 | $\frac{1}{4}$ | 6.35 |
| 8 | 20.32 | $\frac{1}{3}$ | 8.46 |
| 7 | 17.78 | $\frac{1}{2}$ | 12.70 |
| 6 | 15.24 | $\frac{5}{8}$ | 15.85 |
| 5 | 12.70 | $\frac{2}{3}$ | 16.92 |
| 4 | 10.16 | $\frac{3}{4}$ | 19.05 |
| 3 | 7.62 | $\frac{5}{6}$ | 21.15 |
| 2 | 5.08 | $\frac{7}{8}$ | 22.19 |
| 1 | 2.54 | $\frac{11}{12}$ | 23.28 |

| | | |
|---|---|---|
| 1 quart | contains | .9463 litres. |
| 1 pint | " | .473148 " |
| A teacup | " | 4 fluid ounces. |
| A wine-glass | " | 2 " |
| A tablespoon | " | ½ fluid-ounce. |
| A teaspoon | " | 1 fluid-drachm. |

## SILVER COINS OF THE UNITED STATES.

| DENOMINATION. | Weight. | Composition. | |
|---|---|---|---|
| | | Silver. | Copper. |
| Dollar.................. | 412½ grains: | 90 per cent. | 10 per cent. |
| Half-dollar............ | 192 " | 90 " | 10 " |
| Quarter-dollar.......... | 96 " | 90 " | 10 " |
| Dime.................. | 10 " | 90 " | 10 " |

## MINOR COINS.

| DENOMINATION. | Weight. | Composition. | | | |
|---|---|---|---|---|---|
| | | Copper. | Nickel. | Tin. | Zinc. |
| Five-cent piece.... | 77.16 grains. | 75 p. c. | 25 p. c. | | |
| Three-cent piece.. | 32 " | 75 " | 25 " | | |
| One-cent piece.... | 48 " | 95 " | ........ | 3 p.c. | 2 p.c. |